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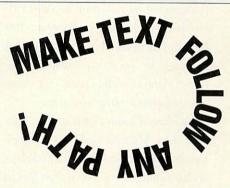
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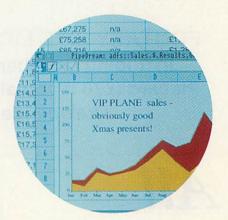
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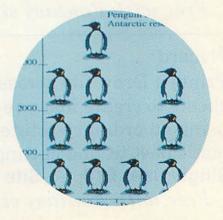
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## JANUARY 1992 **ISSUE 114**

NEWS



COVER PHOTOGRAPH BY **PAUL VENNING** 

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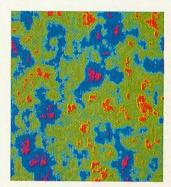
All the editorial pages in BBC Acorn User are produced on a DTP system using Acorn Archimedes 440/1 and A540 computers, Computer Concepts' Impression 2 with Laser Direct printers and Taxan monitors

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| Landmarks, Egypt / Rain Fores                                                                          | t / Second                        |                           | Reporter                                                                  |                                                                | 29                       |
| World War / Victorians                                                                                 | Longman                           | £17                       | Repton 3                                                                  | Superior £1                                                    | 14                       |
| Last Days of Doom                                                                                      | Topologika                        | £16                       | Revelation                                                                |                                                                | 58                       |
| Lemmings                                                                                               | Krisalis                          | £19                       | Revelation 2                                                              | Chalksoft £10                                                  | 09<br>17                 |
| Letters and Pictures<br>Level 4 Fileserver                                                             | Chalksoft<br>Acorn                | £17<br>£160               | Reversals<br>Rhapsody 2                                                   |                                                                | 45                       |
| LISP                                                                                                   | Acom                              | £145                      | RiscBASIC                                                                 | Silicon £1                                                     |                          |
| Little Red Riding Hood, age 5-8                                                                        |                                   | £14                       | RiscForth Compiler                                                        | Silicon £1                                                     |                          |
| Logistix                                                                                               | Acorn                             | £77                       | Risc OS Companion Vol 1                                                   | Oak VO £4                                                      | 49                       |
| Logo                                                                                                   | Longman                           | £55                       | Risc OS Programmer's<br>Reference Manual                                  | Acorn VO £7                                                    | 79                       |
| Maddingly Hall                                                                                         | Minerva                           | £12                       | Risc OS Style Guide                                                       | Acom VOE                                                       | 11                       |
| Mad Professor Mariarti                                                                                 | Krisalis                          | £15                       | RiscType V2                                                               |                                                                | 16                       |
| Magpie                                                                                                 | Longman                           | £39                       | RoboLogo                                                                  |                                                                | 69                       |
| Mah-jong Patience                                                                                      | CIS                               | £15                       | Rockfall<br>Rotor                                                         |                                                                | 16<br>19                 |
| Mailshot<br>Man at Arms                                                                                | Minerva<br>Fourth Dim             | £27<br>£14                |                                                                           | Arcana L                                                       | 10                       |
| Manchester United Europe                                                                               | Krisalis                          | £19                       | Sales Ledger                                                              | Minerva £7                                                     | 78                       |
| Manchester United Football Clui                                                                        | Krisalis                          | £19                       | Saloon Cars                                                               |                                                                | 18                       |
| Maps and Landscapes 1                                                                                  | Chalksoft                         | £19                       | Schema                                                                    |                                                                | 89                       |
| Maps and Landscapes 2<br>Mark Master                                                                   | Chalksoft<br>Chalksoft            | £19<br>£67                | School Administrator<br>Science, drawfiles                                | Minerva £6 Micro Studio £6                                     | 65<br>25                 |
| Master Break                                                                                           | Superior                          | £14                       | Scorewriter PMS Dot matrix                                                | EMR £12                                                        |                          |
| Masterfile II                                                                                          | Beebug                            | £19                       | Scorewriter PMS PostScript                                                | EMR £42                                                        |                          |
| Mazes, drawfiles                                                                                       | Micro Studie                      |                           | Seashore Guide, drawfiles                                                 | Micro Studio £                                                 |                          |
| Memory Magic<br>Mental Maths                                                                           | CIS                               | £14<br>£15                | Sellardore Tales, age 10-12<br>Sesame Street, Letters for You             | Sherston £                                                     | 24                       |
| MicroDrive Golf                                                                                        | CIS                               | £14                       |                                                                           | ctric Crayon E                                                 | 16                       |
| - Extra Courses                                                                                        | CIS                               | £13                       | Sesame Street, Numbers Count                                              |                                                                |                          |
| Micro Trader Accounts                                                                                  | PRES                              | £199                      |                                                                           |                                                                | 16                       |
| MIG-29 Fulcrum                                                                                         | Domark                            | £28<br>£32                | ShapeFX<br>ShareHolder                                                    | Data Store £                                                   | 10                       |
| MIG-29 Super Fulcrum<br>Military History, sprites                                                      | Domark<br>Micro Studio            |                           | ShowPage                                                                  | CC £1                                                          |                          |
| Minotaur                                                                                               | Minerva                           | £13                       | Shylock Gnomes, age 10-15                                                 | Selective £                                                    | 16                       |
| Missile Control                                                                                        | Minerva                           | £13                       | Sigma Sheet                                                               |                                                                | 38                       |
| Mogul                                                                                                  | Ace                               | £15                       | smArt Dinosaurs / Faces / Fashi                                           |                                                                | 54                       |
| Money Matters<br>Movaword                                                                              | Triple R<br>Chalksoft             | £15<br>£17                | Heraldry / Homes / Leisure /                                              |                                                                |                          |
| MultiFS                                                                                                | Arxe                              | £27                       | and Gardens - each                                                        | 4mation . £                                                    | 16                       |
| Multistore version II                                                                                  | Minerva                           | £179                      | smArtFiler                                                                |                                                                | 34                       |
| N                                                                                                      |                                   |                           | Snippet                                                                   | 4mation £1                                                     | 26                       |
| Nature Graphics, drawfiles/spr                                                                         | ites<br>Micro Studi               | o £16                     | SolidCAD<br>SolidsRender                                                  | Silicon £1                                                     |                          |
| Nevryon                                                                                                | Fourth Dim                        | £14                       | SolidTools                                                                | Silicon £2                                                     | 69                       |
| No Excuses                                                                                             | Arcana                            | £17                       | Spark                                                                     |                                                                | £5                       |
| Nominal Ledger                                                                                         | Minerva                           | £78                       | Sparkle<br>Special                                                        |                                                                | 59                       |
| Note Invaders<br>Numbers and Pictures                                                                  | Chalksoft<br>Chalksoft            | £17<br>£17                | - site licence                                                            |                                                                | 30                       |
| Numerator                                                                                              | Longman                           | £60                       | Speech!                                                                   |                                                                | 14                       |
| Numerator Chaos                                                                                        | Longman                           | £18                       | Spelling week-by-week                                                     |                                                                | 19                       |
| Oak Baserday                                                                                           | Oak                               | 600                       | Spitfire Fury<br>Splice                                                   | Fourth Dim £PC                                                 | JA<br>22                 |
| Oak Recorder<br>Office Tools                                                                           | Oak<br>Silicon                    | £28<br>£276               | Sporting Triangles                                                        | CDS £                                                          | 20                       |
| Ollie Octopus' Sketchpad                                                                               | Storm                             | £13                       | Square Route Co                                                           | mputer Eyes £                                                  | 16                       |
| Olympics                                                                                               | Fourth Dim                        |                           | Step by Step Guides (videos): 1                                           | Up & Running,                                                  |                          |
| Order Processing/Invoicing                                                                             | Minerva                           | £78<br>£13                | 2 Text Processing, 3 Data Ha<br>4 Art & Graphics — each                   |                                                                | 12                       |
| Orion<br>Orrery                                                                                        | Minerva<br>Spacetech              | £93                       | Stig of the Dump, age 9-13                                                |                                                                | 21                       |
| Ovation                                                                                                | Beebug                            | £85                       | Stock Management                                                          |                                                                | 78                       |
| Overload                                                                                               | Clares                            | £13                       | Studio 24 Plus                                                            | EMR £1                                                         | 39                       |
| D                                                                                                      |                                   | 017                       | Super-Dump<br>Superior Golf                                               |                                                                | 14                       |
| Pacmania<br>Padlock                                                                                    | ICS                               | £17<br>£10                | Super-Plot                                                                | Silicon £                                                      | 28                       |
| - site licence                                                                                         |                                   | £30                       | Supersound Creations                                                      | CIS £                                                          | 15                       |
| Pandora's Box                                                                                          | Fourth Dim                        |                           | System Delta Plus II  - Reference Guide                                   | Minerva £ Minerva V0 £                                         | 250                      |
| Parametric Design Tool                                                                                 | Oak<br>Minerva                    | £350<br>£19               |                                                                           | Va VUL                                                         |                          |
| PC Access<br>PC Emulator 1.7                                                                           | Acorn                             | £19                       | Tactic                                                                    |                                                                | 15                       |
| Pendown                                                                                                | Longman                           | £47                       | Talisman                                                                  |                                                                | 12                       |
| - Extra Outline Fonts                                                                                  | Longman                           | £16                       | Target Maths                                                              |                                                                | 214                      |
| Personal Accounts                                                                                      | Apricote<br>Triple B              | £24<br>£14                | TechWriter<br>Telling the Time, age 3-12                                  |                                                                | 27                       |
| Picture Book<br>PinPoint                                                                               | Triple R<br>Longman               | £14<br>£75                | Thundermonk                                                               | Minerva £                                                      | 212                      |
| PipeDream 3                                                                                            | Colton                            | £105                      | Timetabler                                                                |                                                                | 549                      |
| PipeDream 4                                                                                            | Colton                            | £179                      | Timewatch                                                                 |                                                                | E24                      |
| nito linonno                                                                                           | Conon                             |                           |                                                                           | LODOIOGIKA 1                                                   | -61                      |
| - site licence                                                                                         |                                   | £1169                     | Tiny Logo + Tiny Draw<br>Toolkit Plus                                     |                                                                | £35                      |
| PipeDriver Dot 1                                                                                       | ICS                               | £10                       | Toolkit Plus Tools Graphics, drawfiles                                    | Clares 9<br>Micro Studio 9                                     | £23                      |
|                                                                                                        |                                   | £10<br>£18                | Toolkit Plus<br>Tools Graphics, drawfiles<br>Touch Type                   | Clares 9<br>Micro Studio 9<br>Iota 9                           | £20                      |
| PipeDriver Dot 1 Pipe Mania PIPP2 Professional Integrated Project Planner                              | ICS<br>Empire                     | £10<br>£18<br>£POA        | Toolkit Plus<br>Tools Graphics, drawfiles<br>Touch Type<br>Tower of Babel | Clares 9<br>Micro Studio 9<br>Iota 9<br>Cygnus 9               | E20<br>E40<br>E18        |
| PipeDriver Dot 1<br>Pipe Mania<br>PIPP2 Professional Integrated<br>Project Planner<br>Pirate, age 8-14 | ICS<br>Empire<br>CIS<br>Chalksoft | £10<br>£18<br>£POA<br>£16 | Toolkit Plus<br>Tools Graphics, drawfiles<br>Touch Type                   | Clares S<br>Micro Studio S<br>Iota S<br>Cygnus S<br>Midnight S | £20                      |
| PipeDriver Dot 1 Pipe Mania PIPP2 Professional Integrated Project Planner                              | ICS<br>Empire                     | £10<br>£18<br>£POA        | Toolkit Plus Tools Graphics, drawfiles Touch Type Tower of Babel Tracer   | Clares S<br>Micro Studio S<br>Iota S<br>Cygnus S<br>Midnight S | E23<br>E40<br>E18<br>E40 |

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£78 £18 £89 £65 £25 £127 £425

£16 £10 £139 £130 £16 £38

£16 £34 £26 £115 £115 £269 £5 £59 £10

£12 £21 £78 £139 £20 £14 £28 £15 £50 V0 £25

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| Transport, drawfiles        | Micro Studio        |            | F   |
|-----------------------------|---------------------|------------|-----|
| Trivial Pursuit             | Domark              | £22        | A   |
| Turbo Type                  | CIS                 | £20        |     |
| Tween                       | Ace                 | £20        |     |
| Twin                        | Acom                | £24        | N   |
| Twin World                  | UBI Soft            | £14        |     |
| TWO (Task and Window Orga   | niser) ICS          | £19        |     |
| - site licence              |                     | 260        | A   |
| Typing Tutor                | CIS                 | £17        | A   |
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| U.I.M                       | Fourth Dim          | £23        | Α   |
| Utility Disc 1              | Data Store          | £13        |     |
| Utility Disc 2              | Data Store          | £13        |     |
| Utility Disc 3              | Data Store          | £7         | A   |
| Utility Collection          | Data Store          | £21        |     |
|                             | Daila Giorg         |            |     |
| View»Mac 3                  | Human               | €65        | Α   |
| - Arc/Mac Cable             | Human               | £24        | A   |
| Viewpoints, age 9-12        | Sherston            | £33        | Ď   |
| Vox Box                     | Clares              | £47        | 4-  |
|                             | Ciares              | Lite       | A   |
| White Magic                 | Fourth Dim          | £14        | A   |
| White Magic 2 + Designer    | Fourth Dim          | £14        | F   |
| Wimp Game                   | Fourth Dim          | £12        | W   |
| Wonderland                  |                     | £12        | VV  |
| Words and Pictures          | Virgin<br>Chalksoft | £24<br>£17 |     |
|                             |                     | 11/        | N   |
| World Championship Boxing M |                     | 000        | C   |
| World Consent Many day      | Krisalis            | £20        | 90  |
| World Geography Maps, draw  | Micro Studio        | £23        | 90  |
| WorldScape                  | Eclipse             | £15        |     |
| World Wildlife, sprites     | Micro Studio        |            | S   |
| Worra Battle                | Oak                 | £13        | A   |
| WorraCAD                    | Oak                 | £75        |     |
| Worra Plot                  | Oak                 | £24        | Fa  |
| Worst Witch, age 7-10       | Sherston            | £24        | F   |
| V                           |                     |            | H   |
| X-Fire                      | Fourth Dim          | £19        |     |
|                             |                     |            | In  |
| Z88: A Dabhand Guide        |                     | £15        | In  |
| Z88 PipeDream Guide         | Dabs VO             | £15        |     |
| Zarch                       | Superior            | £14        | j-5 |
| Zelanites                   | Micro Power         | £14        | i-8 |
|                             |                     |            | S   |
|                             |                     |            |     |

## HARDWARE

| A5     | 000  | COL   | ИPU | ПΞ | RS |
|--------|------|-------|-----|----|----|
| OA Ale | Llas | d Die | Cal | C  |    |

2Mb Hard Disc Colour System Acom £1499

– as above + Learning Curve £1530

(Finance & special purchase schemes available)

#### PRINTERS

| I I III I I I I I I I I I I I I I I I |               |       |
|---------------------------------------|---------------|-------|
| ArcLaser                              | Calligraph    | £895  |
| ArcServer                             | Calligraph    | £985  |
| Bubble Jet BJ-10e                     | Canon         | £205  |
| Bubble Jet BJ-300                     | Canon         | £360  |
| Bubble Jet BJ-330                     | Canon         | £405  |
| Laser Direct HiRes4 with 50-          | sheet tray CC | £895  |
| - with optional 250-sheet             | cassette      | £999  |
| Laser Direct HiRes8                   | CC            | £1280 |
| Laser Direct LBP-4 Card               | CC            | £319  |
| Laser Direct Qume                     | CC            | £829  |
| LBP-4                                 | Canon         | £659  |
| Refill toner cartridge for Can        | on EPS        | £50   |
|                                       |               |       |

#### FUNCTION KEY STRIP ORGANISER Arckey ICS V0 £3 - set of 4 V0 £10

#### MEMORY, MISCELLANEOUS

| Fitting extra unless stated           |      |
|---------------------------------------|------|
| † Fitting easy ‡ Fitting needs expert | ise  |
| A3000 2 Mb Non-upgradable † IFEL      | £55  |
| A3000 2 Mb Upgradable † IFEL          | £63  |
| A3000 4 Mb † IFEL                     | £149 |
| A310 2 Mb Upgradable soldered ‡ IFEL  | 299  |
| - as above + MEMC1a                   | £149 |
| - as above + MEMC1a + fitting         | £200 |
| A310 4 Mb soldered + MEMC1a ‡ IFEL    | £225 |
| - as above + fitting                  | £277 |
| - as above + fitting + OS3 carriers   | £298 |
| A5000 4 Mb Upgradable † _ Atomwide    | £109 |
| ARM3 ‡ Atomwide                       | £249 |
| Dongle Dangle with screw fittings ICS | 26   |
| 4-slot 4-layer Backplane IFEL         | £59  |
| A310 RISC OS Carrier Board ± IFEL     | £25  |
| A300/400 Fan kit ICS                  | £15  |
| Fan filters (set of 10) ICS           | £4   |
| Whisper Fan Quietener ICS             | £15  |
| Thisper Fair Gallerian 100            | 210  |
|                                       |      |

### MICE, MONITORS

| Clares | £26  |
|--------|------|
| Eizo   | £450 |
| Eizo   | €640 |
|        | Eizo |

#### SCANNERS, DIGITISERS ArcScanner including Epson GT-4000

|                             | Clares      | 21000 |
|-----------------------------|-------------|-------|
| FaxScan                     | Spacetech   | £94   |
| FX9600AT + Maintenance      | Amstrad     | £376  |
| Hawk V9                     | Wild Vision | £199  |
| - A3000 version             | Wild Vision | £278  |
| Image (colour)              | Irlam       | £589  |
| Image Scanner               | lota        | £389  |
| - Colour upgrade            | lota        | £98   |
| i-Scan 200                  | Irlam       | £539  |
| i-Scan 400                  | Irlam       | £589  |
| Scan-Light A4               | CC          | £346  |
| - with Sheet Feeder         | CC          | £431  |
| Scan-Light Junior           | CC          | £165  |
| - A3000 internal            | CC          | £165  |
| Scan-Light Junior 256       | CC          | £199  |
| - A3000 internal            | CC          | £199  |
| Scan-Light Professional     | CC          | £840  |
| - as above + SCSI interface | CC          | £940  |

## I2C PRODUCTS

| AnDi Oddule                              | Baildon | £49 |
|------------------------------------------|---------|-----|
| I2C Adaptor (needed unless you           |         |     |
| already have an I <sup>2</sup> C socket) | Baildon | £10 |
| I2C SWI (enhanced IIC_Control)           | Baildon | £15 |
| - bought with Oddule                     |         | 25  |

## KEYBOARD COVERS

| Kador | £14                                     |
|-------|-----------------------------------------|
| Kador | £14                                     |
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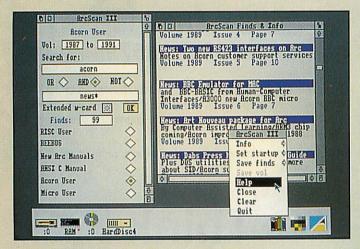
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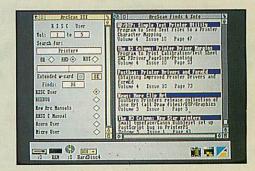
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## **UPGRADES BOOST A5000 MEMORY**

TWO COMPANIES - Atomwide and Risc Developments have already released separate Ram upgrades for the new Acorn A5000.

Atomwide's 4Mb card is offered as a first-stage upgrade to the A5000's standard 2Mb, bringing the total memory up to 4Mb. The card can be further upgraded to 8Mb.

The 4Mb upgrade can be fitted by users and involves no soldering or expert knowledge. However, the upgrade from 4Mb to 8Mb requires the user to send the A5000 to Atomwide for fitting. The cost

courier collection includes and delivery. The 4Mb card costs £110 plus VAT and the 4Mb to 8Mb card costs £399 plus VAT. Contact Atomwide, 23 The Greenway, Orpington, Kent BR5 2AY. Tel: (0689) 838852

Risc Developments' 2Mb Ram card also upgrades the standard A5000 2Mb memory to 4Mb. The card measures 104 x 80mm and can be fitted by users in about 15 minutes. It costs £109 plus VAT from Risc Developments, 117 Hatfield Road, St Albans, Herts SL1 4JS. Tel: (0727) 40303.



## **EMULATOR UPGRADES**

CONFUSION about upgrading to Acorn's new PC Emulator has prompted new guidelines from the company.

There are two emulator 1.70 upgrades. The AKA48 emulator is for users of MS-Dos. Version 1.7 differs from version 1.60 in that it runs on the new A5000 computer. Apart from this, the only difference is that some minor enhancements have been made to improve the way that some Dos applications run. Upgrading from 1.60 costs £15, while upgrading from earlier versions costs £29.

The AKA45 emulator is for users of DR-Dos, which is supplied with the Learning Curve. In addition to version 1.70 of the emulator, this upgrade also includes DR-Dos 5.00, which is a major step forward from version 3.41, supplied with the Learning Curve. The price is £39 and is said to be higher because it includes the DR-Dos 5.00 licence fee. Prices exclude VAT.

To obtain your upgrade, send your original emulator disc with a cheque made payable to Acorn Direct to: PC Emulator 1.70, Acorn Direct, 13 Dennington Road, Wellingborough, Northants NN8 2RL.

## 'THE WORST IS OVER'

REDUCED funding for education as a result of the Gulf contributed towards Acorn's financial losses in the first half of this year, according to the company's half-year financial report.

In what it describes as 'the most difficult trading environment in the UK economy for several years', Acorn Computer Group PLC made a net loss of £420,000 in the first six months of this year, compared with a net loss of £242,000 for the same period last year.

Sales revenue was down to £17.8 million (£22.1 million last year) and the operating profit was £118,000 (£361,000 last year). Interest expenses, related to the build-up in working capital, in late 1990 to early 1991, accounted for the net loss. The group's indebtedness had risen to £9.7 million by the end of December 1990, reflecting the build-up of stock last year as the recession began to bite. The company placed emphasis on converting stock and debtors to cash, reducing the debt to £5.9 million by June 30 this year.

Acorn now claims an installed base of 150,000 32bit Risc machines. Figures released in June by the independent research company, IDC, showed Acorn to be the fifth largest supplier of computers in the UK, with Acorn computers in 90 percent of schools in the UK.

Acorn's managing director, Sam Wauchope, said that despite the difficult trading period, sales this summer had exceeded those in previous years and that the company's new products - including the A5000 machine launched at this year's BBC Acorn User Show - had been extremely well received.

Sam Wauchope added that Acorn would continue its policy of controlling overheads and introducing new products in order to 'face its future with confidence'. The general feeling at Acorn is that the worst is over.

## **WORKSTATION KEEPS TRACK RECORDS**

A NEW bio-mechanics workstation, developed to help athletes analyse and improve upon their movements, has been developed by Salford College of Technology.

The workstation - consisting of an Archimedes, a video frame-grabbing card and a Super VHS video recorder can be used to analyse athletes' movements and show them how to enhance their performances.

The system, which took the team at Salford three years to design, allows qualitative analysis to be presented in a format that is easy to understand. Although expensive - the complete system costs around

£8000 - it is said to be around one-third of the price of anything currently available.



As well as helping to revolutionise athletics training, the system also has potential for the care and rehabilitation of disabled people, placing heavy emphasis on reliable and accurate analysis. It is currently being used by physiotherapists to evaluate limb function and injury treatment.

Top sprinter John Regis, a founder member of the Acornsponsored Chafford Hundred Athletics Club, visited Salford College recently to try out the machine. For further information about the system, contact Graham Covell, Salford College of Technology, Frederick Road, Salford M6 6PU. Tel: 061-736 6541.

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If you have been thinking of getting an A3000 there has never been a better time.

This special offer provides an excellent system ready for immediate use. The hard drive, RAM and Ovation are all installed ready so you can simply turn on and start.

Ovation is the highly acclaimed package combining word processing and DTP. Widely used in education it offers a whole host of features and is powerful and yet simple to use.

Our high speed IDE drive was designed especially for the A3000. It has an access time faster than ST506 or 8 bit SCSI, features auto-parking and sleep mode and is fitted in the internal expansion slot.





- ☐ Acorn A3000 Computer
- Genuine Acorn Colour Monitor
- ☐ Monitor Plinth
- □ 2 Mb RAM
- 20 Mbyte Internal Hard Drive
- Ovation DTP Normal Price £1299 + VAT Save Over £300

## Special Offer £999 + VAT

(£1173.83 INC VAT)

The A3000 Learning Curve is also available if required. This includes Pacmania & Lemmings games, Genesis II Database, 1st Word Plus, Acorn PC Emulator and a 120 min audio training tape. Just add £40 + VAT (£47.00 inc VAT).

Courier Delivery Please add £9.00.

## **The A5000 Learning Curve**



The A5000 is now available from BEEBUG, either from our showroom or mail-order.

BEEBUG are one of Acorns largest dealers and have been supporting the Archimedes range since its launch.

You can have total confidence in BEEBUG. Our technical team are always on-hand to provide any assistance and help that you may need with the A5000.

BEEBUG & RISC Developments also produce the magazine RISC User, dedicated to the Archimedes range.

BEEBUG - The Archimedes Specialists

The New Learning Curve Pack

☐ 1.6 Mb Format Floppy Drive

□ Acorn Multi-Scan Monitor

New Multi-tasking PC Emulator

**A5000 Features** 

ARM 3 For Unbelievable Speed

RISC OS Version 3

☐ 40 Mb IDE Hard Drive

- Genesis 2 Database
- 1st Word Plus Wordprocessor
- Acorn DTP
- Lemmings and Pacmania Games
- Audio Training Tape
  - Optional 300 dpi Ink Jet Printer

The A5000 Learning Curve Complete With Acorn Multi-scan Monitor Is Now Available For £1799 Inc. **Phone Or Write To Reserve Yours Now!** 

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**Educational Establishments** Please Ask For Our Educational A5000 Price

0% Finance Over 12 Months NOW AVAILABLE ON THE A5000. Deposit £179 Plus 12 payments of £135. APR 0%. Please ask for a finance application form.



Phone Or Write For An Information Pack All products covered by 12 months full warranty Access / Visa / Switch / Cheque / Official Orders Welcome Showroom hours Mon to Sat 9 am - 6 pm (Thu until 8 pm)



## **VIDEO MAIL BY THE YEAR 2000**

SENDING video mail from a desktop computer should be commonplace by the end of the decade. That is the claim of Dr Andy Hopper, managing director of Cambridge-based Olivetti Research Laboratory, who has been using Acorn Unix workstations to make the video mail concept a reality.

A special laboratory at ORL jointly funded by Olivetti Systems and Networks and Digital - is currently developing powerful multimedia workstation and networking technology which will allow TV-quality images to be created, stored and transmitted.

Video mail is just one of the applications made possible by ORL's Pandora project. Based on multiple Inmos Transputers. Pandora's 'box' is a peripheral device for handling networked digital video and sound streams, independent of host hardware and software. Twenty Pandora systems have been built and networked around ORL and Cambridge University to create a true multimedia environment. Each



system interfaces to an Acorn Unix workstation, CCD camera, high resolution display, telephone and microphone.

In addition to sending video mail. Pandora can be used for high quality video-telephone or conferencing applications. Dr Hopper, who was Acorn's technical director when the company was founded and was responsible for the introduction of Econet, said: 'Most people find it easier and faster to speak a message rather than write it down, and it will be possible to stop and start again, or edit as you go along. I believe that video mail is one application that will have a major impact on business communications, improving management efficiency and effectiveness and promoting faster decision making'.

Contact Dr Andy Hopper, Olivetti Research Ltd, Old Addenbrooks Site, 24a Trumpington Street, Cambridge CB2 1QA. Tel: (0223) 343000.

## **NEWS IN BRIEF**

- BEEBUG has come up with a saving of £300 on an A3000 hard drive desktop publishing system. It includes an A3000 computer, Acorn colour monitor, 1Mb Ram upgrade, 20Mb internal IDE hard drive and Ovation DTP software. The system costs £999 plus VAT and is supplied installed and ready to use. You can contact Beebug on (0727) 40303.
- IN LAST month's issue we mentioned an advertising insert from ESM about the company's Christmas Theme Pack for Desktop Folio. However, we understand that this may not have appeared in some issues. For information, please write to: ESM, Dept 17, Duke Street, Wisbech PE 13 2AE.
- PERISCOPE Software has released Karma - The Flight Trainer to all space cadets (aka high-flying Arc users). The package is the first instalment of the package and provides training which will prove relevant to subsequent releases of Karma. The Flight Trainer for the Archimedes and A3000 costs £24.99 plus £1 p&p and is available from Periscope Software. Tel: (0462) 893107.
- ALPINE Software has asked us to point out that the company does not publish Star Trader or Word Up Word Down games, as mentioned in our games supplement. However the company does publish Plague Planet. Contact Alpine Software, PO Box 25, Portadown, Craigavon BT63 5UT.
- RISC Developments has introduced two new packages for the Arc. PolyGlot is a foreign language character set package for use with wordprocessors, DTP packages, etc. Characters which are impossible or difficult to obtain from the keyboard - such as letters with characters in French or umlauts in German - are possible with the program. It costs £14.95. Chartwell is a graph and chart package which offers 24 different graph types, including horizontal and vertical bar charts, line graphs, scatter charts, polar plots and pie charts. It costs £24.85. Contact Risc Developments on (0727) 860263. IN OUR reviews of Elite and
- Bubble Fair last month we unfortunately did not include the usual product details. Elite costs £39.95 from Hybrid. Tel: (0223) 861522. Bubble Fair costs £19.95 from Eterna. Tel: (0933) 279300.

## **WOULD YOU WARRANT IT?**

FOLLOWING our recent review of Arm3 upgrades for the A3000, some readers have asked if the fitting of such upgrades is likely to affect the Acorn warranty.

Aleph One, which produces one of the upgrades reviewed, recently sent out the following statement: 'A3000 users can buy the Aleph One Arm3 knowing that it has been tested by Acorn and that fitting it to their computer will not void remaining warranty.' According to Acorn, although this is true, the technical support department does not offer an official 'seal of approval' to third party products. However, developers are encouraged to consult with Acorn at various stages of development.

 Meanwhile Aleph One has reduced the price of its Arm3 upgrade to £249 plus VAT and a £35 fee for fitting.

## FROM RUSSIA WITH LOVE

SOVIET television viewers are enjoying a Russian version of the TV game Love at First Sight, featuring graphical onscreen images that were made using an Archimedes 400series machines.

The show, which is almost a direct translation of the version shown on Sky TV, features contestants who have to decide who to pick for a date. Onscreen graphics include a 'love board', contestants' names, a spray of hearts, and so on.

The software was written by Chris Goss of G Graphics, who uses a Prisma 3 graphics engine controlled by an Archimedes. The Prisma unit provides broadcast quality, genlockable video signals to achieve real-time animation and video effects. The computer also generates the sound effects for the show and controls the button interfaces on the contestants' consoles.

Chris Goss has provided computer graphics for many TV shows, including Jeopardy and Busman's Holiday. He uses Acorn's PC Emulator to transfer text files provided by the game show production teams to the Archimedes for manipulation. He writes most of his software in BBC Basic. He explains: 'When TV producers want last minute changes to the computer effects, it would be impractical to have written the programs in C or some other high level language. Basic on the Arc is comprehensive enough to give me all the facilities I need. If I had to rely on an ordinary PC, quite apart from the expense involved, it would extremely difficult to control everything I wanted from just one machine.'

Contact G Graphics, 37 The Avenue, Twickenham, Middx TW1 1QU. Tel: 081-891 3962.



## **NEW ACORN PORTABLE FOR BETT 92 SHOW?**

AT LAST year's BETT 92 Show, Acorn apparently had a prototype of a portable computer hidden in a plastic bag. It was there in case Research Machines on the stand next door revealed its new Nimbus portable. As it turned out, RM had a prototype in a plastic bag as well - in case Acorn revealed its version first.

Since then, the race to produce a portable for education has been won fairly and squarely by RM, with its Notebook range, Nimbus released earlier this year. The entry level model costs £499.

Of course, this isn't just a two-horse race. There are a host of IBM and compatibles on the market, and Apple has just released its new notebook series. And companies such as The Educational Notebook Company and Tandy are also in the running. So what of Acorn's progress in this area

of the market? After all, with machines in 90 percent of schools, they surely cannot afford to wait much longer before releasing a portable range? Well, promises of a release before the end of the year have vanished - and any hope of an appearance at the recent BBC Acorn User show were upstaged by the launch of the A5000 machine.

The betting now is on the BETT 92 Show in January. The plastic carrier bags are likely to be discarded and the new model will be on show for all to see - at least, that is the rumour. Whether it will be on general release or just the prototype is even less certain, but a recent letter to software developers from Acorn requested ideas for 'portable applications' - a bit late in the day for a January launch, but at least it indicates some movement. Watch this space!

## WATFORD WINNER

VISITORS to the recent BBC Acorn User Show encouraged to enter a special prize draw run by Watford Electronics. The prize on offer was a Panasonic KX-P4420 printer, donated by Watford Electronics and Panasonic, and worth over £700.

The picture below shows (left to right) BAU editor Barry Monk, Nazir Jessa, managing director of Watford Electronics and Sam Wauchope, managing director of Acorn Computers, selecting the winning entry, from Mr Hadekel of London SW6.



## **DISC SURVEY**

WANT to win a free subscription to your favourite Acorn magazine? Then give us your opinions of BAU's cover mounted discs by answering the questions below there are five free subs to be won.

Regular readers may recall the free Archimedes discs which were cover-mounted onto the magazine recently - a demo of ESM's Desktop Folio package in October and demos of Chocks Away and Lemmings in November.

What we would now like to know is your opinions on the possible content of future discs and how much - if anything - you might be prepared to pay for a magazine/disc package.

To help us give you the package you want, please write your answers to the following questions, along with your own name and address, on a postcard and send it to: Disc Survey, BBC Acorn User, Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ. Replies should reach us by no later than January 17 1992. Five free subscription winners will be drawn from the hat when all of the entries are received.

#### **DISC SURVEY QUESTIONS**

- 1. Which disc format would you prefer to receive? a) 5.25in b) 3.5in
- 2. How much extra would you be prepared to pay for the magazine with a cover-mounted disc? a) 50p b) 75p c) £1 d) No more
- 3. How would you prefer to access the programs featured in the magazine?
- a) From the cover-mounted disc b) Typing in from the current yellow pages listings
- 4. Would you like to see demos of new programs featured on the discs? a) Yes b) No
- 5. What types of program are you most interested in? (You may select more than one category)
- a) Games
- b) Education packages
- c) DTP
- d) Databases
- e) Spreadsheets
- f) Wordprocessing
- g) Programming

h) Other (please specify)

## **NEW TWIST** AT QDE

THE QDE Group, which producers of products under The Serial Port label, will launch a new label called Vertical Twist next month.

All products presently marketed under The Serial Port label will be moved across to the new label over the next few months. The only exception is Arctern 7, which will be handled separately by Hugo Fiennes, who will continue trading under the current Serial

However, QDE will still be selling Arcterm 7, including a new range of modem and packs created in association with Pace. QDE Group managing director, Andrew Foyle, said: 'With this new label totally under our control we will give a better level of customer service than was previously possible'.

Contact QDE Group, 30-33 South Street, Chichester, West Sussex PO19 1EL. Tel: (0243) 531194.

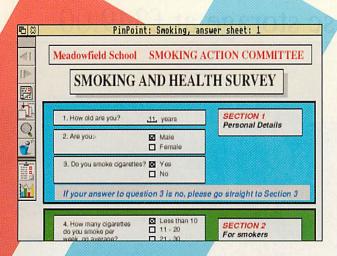
## SHARE AND SHARE ALIKE

FOR multi-computer organisations who cannot afford to put a printer on every desk, a new device should encourage printer sharing.

Epshare from Micro Control Systems is designed for use with Epson heavy-duty dot matrix and laser printers and allows six users to share the same printer. It has a 1Mb buffer (a 4Mb version is on the way) and allows any Epson printer in the SQ, LQ, TLQ and DFX ranges to be shared. Each device has six input ports - three parallel and three serial. Data can be accepted on all input ports simultaneously and optional automatic form feed is possible. The unit costs £349 plus VAT from Micro Control Systems, Electron Bridge House, Street. Sandiacre, Nottingham NG10 5BA. Tel: (0602) 391201.

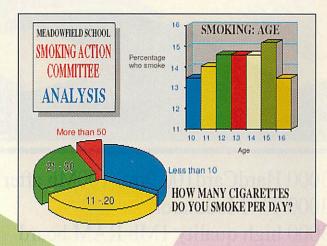


# A revolutionary new database which could change the way you think and work



The information you collect can be sorted, selected, statistically analysed and presented graphically in any number of ways. The powerful object-oriented graphing and presentation tools give you 2D and 3D pie charts, bar charts, line graphs, scattergraphs and lines of best fit. You can also browse through information in tabular form, rearranging or eliminating rows and columns. Information can be freely exchanged between *PinPoint* and other RISC OS applications. Instead of a database, a spreadsheet, a graphing package and a DTP program, you now only need...

The idea behind *PinPoint* is as simple as it is revolutionary. Imagine a program which allows you to design and print any form as easily as using the best DTP package. Suppose, as your design takes shape, you are simultaneously building a complete database to handle the information your form can display. Perhaps you want to enter information directly onto the form electronically, with no need to use paper. Or your data can be entered from completed paper forms using the latest WYSIWYG data entry techniques, optimised to save time.



# PinPoint

Information collection and analysis, all in one.



LONGMAN LOGOTRON 124 Cambridge Science Park, Milton Road Cambridge CB4 4ZS Tel. (0223) 425558 Fax (0223) 425349



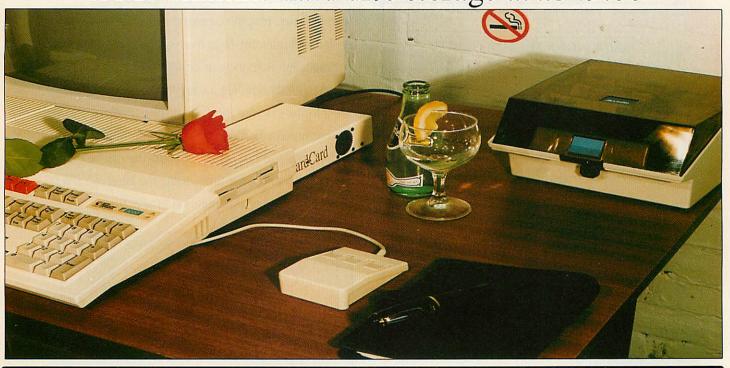
## Features:

- Wide choice of database design for graphical analysis
- ▼ WYSIWYG data entry using mouse or keyboard
- ▼ Frequency, Percentage, Popularity and Cumulative Frequency field analysis
- ▼ Powerful table style information browser
- ▼ Full sorting and selection of records
- ▼ Ability to calculate a wide range of statistics
- ▼ Multi-file analysis
- ▼ OOP presentation tools
- ▼ Full information exchange from other RISC OS packages, using text, CSV and draw files.

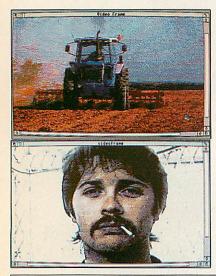
PinPoint, for the Acorn Archimedes, is priced at £99 A Site Licence costs £400 For more details please contact us.

# HardCard45

45Mb slimline hard disc storage at £349.00



| £699.00 |
|---------|
| £39.00  |
| £59.00  |
| £69.00  |
| £189.00 |
| £13.00  |
| £19.00  |
|         |

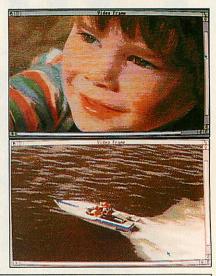


## H1000 Colour Video Digitiser

The H1000 is probably one of the most advanced digitisers on the market for Archimedes and A3000. It produces excellent results whilst only occupying a half width podule slot. The of the H1000 for the A3000 includes podule case, please specify machine type when ordering.

£249.00





ALL PRICES QUOTED ARE EXCLUSIVE OF VAT. CARRIAGE ON ALL ITEMS IS FREE. E&OE. SEND CHEQUES TO HCCS ASSOCIATES LTD. 575-583 DURHAM RD., GATESHEAD, TYNE & WEAR, NE9 5JJ. TEL (091) 487 0760 FAX (091) 491 0431



## **NEW OVERLAY KEYBOARD**

OLDHAM SEMERC Overlay has been developed by iibit Education Products for Northwest SEMERC. An A3 board with 128 programmable keys on to which software overlays are placed, it is compatible with existing Concept Keyboard software.

Made of sturdy plastic it has a wipe-clean keypad, with rounded edges for safety. A single switch access interface, incorporated into the keyboard, enables it to be used by SN pupils. Using the switch's jack plug disables the keyboard itself.

The education price is £120; this includes support material and discount vouchers redeem-



able against NW SEMERC software. For more information contact NW SEMERC at Fitton Hill CDC, Rosary Road, Oldham OL8 2QE. Tel: 061-

## 627 4469.

STAR PROJECT

PROJECT GEMINI, funded by British Telecom and managed by NCET, has been set up to examine how electronic communications can help students aged five to 18, and to promote the development of support materials.

It is to consist of a number of individual projects encompassing topics such as fax machines, email and satellite technology. Multimedia has proved effective in supporting the curriculum, and proposals examining the use of a combination of media will be welcomed. Each project will have its own co-ordinator, and is to last at least a term and no more than one year.

Work arising from the projects has to be easily replicable in other schools, and participants are expected to develop materials such as case studies and resources.

There are a number of entry points into the scheme scheduled to run until August 1993 - each with a closing date for bids; 7 February 1992, 1 May 1992 and 2 October 1992. LEAs and schools wishing to take part should contact the National Coordinator, Ian Webster, at 56B Mansfield Road, Brinsley, Nottingham NG16 5AE.

## **NEWS IN BRIEF**

- 4MATION HAS released a new borders disc to accompany its popular program, Posters. Entitled Ethnic Borders, it contains over 40 designs, the inspiration for many of which came from the author's native homeland, New Zealand. The disc costs £10 from 4Mation, 14 Castle Road, Barnstaple, Devon EX32 8PA, Tel: (0271) 25353.
- **THE NATIONAL Curriculum** Working Party on Modern Languages report, highlighted seven areas to be covered in key stages 3 and 4. These recommendations have been used as the basis for the modules of Bonjour de France: Ma Ville. The first in a series of four Genesis applications, it enables users to work at their own pace and develop awareness of how the language works.

Although based on National Curriculum requirements the pack, which contains nine floppy discs and over 100 worksheets, can be used by anyone starting to learn French. It costs £95 from Oak Solutions, Robin Enterprise Centre, Leeds Road, Idle, West Riding BD10 9TE. Tel: (0274) 620423.

 ECONOMICS students will welcome Yes Chancellor as an opportunity to set the economy back on its feet. The simulation includes setting tax and interest rates, and dealing with inflation and strikes.

As you make decisions the computer keeps you up-to-date with the latest economic facts. The new Arc version includes features such as Britain's membership of the ERM. It costs £20 for the BBC and £23 for the Archimedes, from Chalksoft, PO Box 49, Spalding, Lincs PE11 1NZ. Tel: (0775) 769518. GRAPHBOX Professional has

over 40 graph types to cater for all sorts of data, whether you need an accurate representation of this year's examination results or a pictorial display of the area's population density.

It has an in-built editor, and can perform statistical analysis of input data, providing the results in either a CSV file or a text file. As charts and graphs are produced as draw files, they can be exported to other Arc applications.

**Graphbox Professional costs** £129, or £94 if you trade in the original Graphbox. Contact Minerva Software, Minerva House, Baring Crescent, Exeter EX1 1TL. Tel: (0392) 437756.

## PICK OF THE FLOWER CROP

AS EVERYONE knows, wild flowers are meant to be seen, not picked - a sensible precaution which nonetheless makes identification of the various species one comes across very difficult. One solution is to take a botany encyclopaedia on your trips, but an easier method is to use Mercury's Wild Flowers identikit pack.

Children are encouraged to observe the plant in its natural environment. Using a photocopiable activity sheet they record its main characteristics by means of easily recognisable features such as height,

colour and the shape of petals or leaves. This data is transferred to the computer for identification by answering questions presented in graphic form on-screen.

The database is in KEY format and contains over 500 flowers, each held as a separate record with 22 fields such as leaf shape and habitat. The Identikit and Key datafile costs £24.43 for the BBC B and Master; the datafile for the Arc is £12. Contact Mercury Educational Products, 8-10 Lower James Street, London W1R 3PL, Tel: 071-287 5060.

# Flower shape Not sure

⟨SPACE⟩ ⟨♠⟩ ⟨♣⟩ to select ⟨RETURN⟩ to confirm (ESCAPE) to go back

VISUAL QUESTIONS SHOW EASILY RECOGNISABLE DETAILS

## E LaserDirect Direct drive 6 page per minute printers with our unique LaserDirect software - which means the fastest printing time of any Archimedes printer, background printing, page compression, page queuing, choice of half tone settings and Epson LQ emulation. Based on the Qume 300 dpi printer engine. Computer Concepts Ltd Gaddesden Place, Hemel Hempstead, Herts. HP2 6EX Tel: 0442 63933 Fax: 0442 231632



## **VISIT NEW SILICON VILLAGE**

A NEW Micronet-type system has been by created by former Micronet editor, Paul Needs, and the Prestel information providers, New Media Services (NMS).

Called The Silicon Village, it will endeavour to attract many ex-Micronetters after the untimely closure of the system by British Telecom last month. Silicon Village aims to carry on where Micronet left off and, as well as attracting ex-Micronet subscribers, it will be canvassing hard to attract some new members.

Initially the system is operating on two lines, in Reading and London, although local access will be available soon via the Mercury network.

Like Micronet, Silicon Village will be a subscriber-only system, costing £6 per month with additional call charges of 2.5p per minute. However, two free hours are provided with each monthly subscription. In addition, a one-off registration

Users of Micronet will be instantly familiar with a number of features offered by the new system. Waveguide provides up-to-date gossip and details on television and radio programs. An active BBC



## SLASHER RETURNS NOW THAT SILICON VILLAGE IS OPEN

Micromag is present, edited by long time Micronet member, Geoff Cox. Fans of satirical banter and scandal will be pleased to know that Slasher is back. BT banned the controversial Slasher from Micronet nearly two years ago.

Indeed, being completely separate from BT, Silicon Village is free of many of the restrictions that BT imposed believed to have caused Micronet's downfall - namely, Chatlines - has been restored on Silicon Village.

very much like a conventional 'village', with 'shops', such as a 'Post Office' for sending electronic mail. You can even go to the 'newsagents' for the latest news from around the world, or pop-in to the 'pub' to catch up on chat and gossip. You can also join one of the numerous clubs or closed user groups to share ideas and views with other people.

Each new subscriber also gets a free 26-frame gallery, where users are encouraged to edit their own frames, or even advertise. Indeed, rumour has it that a certain BBC Acorn User columnist may well be setting up an area, very similar the now defunct BBC Microbase of Micronet.

### fee of £10 will be charged. on Micronet. One aspect

Silicon Village is set out

## **NEWS IN BRIEF**

- FOLLOWING the closure of Micronet last month, fans of multiuser games, such as Shades and Trash, will be pleased to know that the organisers of Shades have formed their own viewdata network - called Tessier Ashpool Online, or TAO for short. The system is currently based in London on 071-275 9996 (ANSI, 8N1) and you can log on as a quest, for a free demonstration, by using the name 'Guest' and the password 'Public'. If you would like to apply for your own personal account and password, you should write to TAO, Worth Corner, Turners Hill Road, Pound Hill, Crawley, West Sussex RH10 7SL, or fax them on (0293) 885277.
- THIS MONTH'S freebie plug goes to what is probably the longest running BBC Bulletin Board service - The Gnome at Home. It has now been online almost since the creation of the BBC in the early 1980s, catering for all users of the BBC and, more recently, the Archimedes. Lots of message areas are supported, along with numerous special interest areas, current affairs and news topics. Some nicely drawn viewdata frames accompany most of the sections too, along with many humorous quotes and comments. Give Gnome a ring on 081-888 8894 (viewdata 7E1).
- THE ARCHETYPE BBs has recently moved to a new location in Jersey, so please amend your telephone directories to (0534) 54864. It now also supports 14400 baud for users of HST modems.
- ALSO ON the move is the Atlantis BBs. It is now based in Brighton and the new number is (0273) 696060. The system runs on a Courier HST, and supports all speeds from 300 baud up to 9600 baud. There are also some imminent plans to support both FidoNet and Netmail.
- A PLEA for help. Do you know what has happened to the London City Magazine BB? It used to be on 081-468 7648, but I believe it has now moved. If you log on to this board, or know its new home, please contact me.
- IF YOU have any news, or hints and tips, why not share them with your fellow comms buffs? Send your letters to: Paul Vigay, BBC Acorn User, 20-26 Brunswick Place, London N1 6DJ.

### ARCHIMEDES VIEWDATA SOFTWARE

WAITING FOR the first Archimedes viewdata host software to be released? Then wait no longer - it's here.

Questor Viewdata Host from Mad Rabbit Systems provides sysops (system operators) with a viewdata host system. It runs to Prestel standards under the Archimedes Risc OS environment.

QVH is capable of storing an unlimited number of frames, dependent only on the storage capacity of the hard disc on your machine. Scrolling messages can be displayed anywhere on screen, together animated (dynamic) frames. Routing can be via numbers, keys or keyword shortcuts and all frames can be

password and privilege protectable. One great advantage of the system is that it provides an offline frame editor, that is Wimp-driven.

Of course, full online editing is also provided, enabling you to have remote CUG editors. Full messaging is also catered for, including rotating chatboards. The messaging system also allows output to files to enable offline reading of messages using standard ArcBBs mail readers.

CET downloading, together with X/Ymodem uploading and downloading (under scrolling conditions) is also supported. Files can be tagged by users for easier downloading and the system can be set

to download files, only if a previous message has been set by the sysop.

Frame converters for a number of other systems including and CARBBS planned, as well as Zmodem protocols for scrolling systems. It is also hoped that Questor will be the first viewdata host to support the Fidonet mailing system.

QVH will run on an A3000/ Archimedes with IMb. although 2Mbyte is recommended, as is a good-sized hard disc. Ouestor Viewdata Host costs £40 from Mad Rabbit Systems (Q), 22 Oakwood Grove, Horbury, Wakefield, WestYorks WF4 5JE.

Paul Vigay



## STATE OF THE ARC GRAPHICS

**DESIGNED** as a professional graphic design package, Art-Works from Computer Concepts looks set to do for graphics what the company's Impression package did for text processing.

ArtWorks is an object-based design program, similar to Draw. Pictures can be built-up from objects, such as lines and polygons, which when placed can be edited independently.

Being object-based, Art-Works can produce highquality output, limited only by the type of printer being used.

The package is compatible with illustration packages such as Corel Draw on the PC and Adobe Illustrator on the Apple Macintosh. This means that you can transfer files created with PC and Mac programs to ArtWorks, thus creating an instant picture library.

Written in Arm code, Artworks can run very fast. On the new A5000, speeds of up to four to five times faster than similar programs running on 486-powered PCs have been recorded. Even on a standard Arm2-based Archimedes or A3000, ArtWorks achieves a commendable speed. Works also contains a versatile collection of tools. Computer Concepts has drawn on all of the best features from the leading PC and Mac drawing packages, and then added a lot



more. Although the Archimedes is currently unable to display full 24-bit graphics -16,777,216 colours on screen - Artworks supports 24-bit colour, which can be reproduced through printing. Three types of colour control are supported: HSV (Hue, Selection, Value); RGB (Red. Green, Blue) and CMYK (Cyan, Magenta, Yellow, Key Black). Extended palettes are simulated on screen by dithering, to display thousands of shades simultaneously.

Graduated fills can be applied to any object and can be either linear (following a horizontal, vertical or diagonal direction) or radial (originating from a single point and spreading in a circular direction). A comprehensive set of distortion tools is provided that allow any object to be stretched in a number of ways. Full perspective projection is possible from any two-dimensional elevation.

In addition to full implementation of Risc OS outline fonts, ArtWorks offers further enhancements with text at any angle, or following any predefined curve, or distorted into any shape. New tool modules can be added as required

ArtWorks should be in production by early 1992. The price is expected to be approximately £150. Contact Computer Concepts on (0442) 63933 for more details.

## **SCRIBBLES**

 WELCOME to our first monthly column on computer art and graphics. Each month we hope to bring you the latest news and gossip covering everything graphical, including hardware and software. In addition, we would like to hear from anyone who has anything of special interest to say or ask concerning computer graphics.

In future months, there will be a regular 'gallery' slot for artistic computer buffs, Images are welcome in any format, including the eight-bit Model B and Master 128. We look forward to seeing examples of your artistry - don't forget to include details of the packages you used and a description of how you created your image. Write to: Rob Miller, Graphics Column, BBC Acorn User, 20-26 Brunswick Place, London N1 6DJ.

● AT THE PREVIOUS Computer Graphics Exhibition there was nothing available for Acorn users. This year, however, saw a new presence appearing among the Iris systems and Silicon workstations.

A handful of Acorn exhibitors were exhilarated by the amount of interest from visitors to the show. Computer Concepts was showing off Artworks, and Wild Vision its new Eagle graphics card, which allows live video to be shown in a window on the desktop.

Our established readers may remember an article about Cadsoft, who use an Archimedes to drive a Millipede Prisma 3 graphics card. The company is still going strong and found the show very promising. Eiedos, another graphics presentation company, also claimed a good response.

UniqueWay, a company new on the Acorn scene, were selling an add-on to the Quantel Paintbox. Via a SCSI link, an A5000 is used to catalogue the images on the Quantel and provide prints of these images for clients: also from UniqueWay was a live linked teletext system running on a 440, which will be of interest to TV companies and trainee film producers. Simis was also showing off its new graphics processor card.

Patrick Neal from Acorn was there, casting a proud eye over the Acorn element, and after the success of the show, we're sure he went back to HQ fired up about Acorns potential within the professional graphics world.

## STILL VIDEO IMAGES ON FLOPPY DISC

A NEW method of capturing images has arrived with the recent introduction of the Canon Ion still video camera.

Electronic still video cameras record images using a similar method to that of a conventional video camcorder, except that these images are stored not on video tape, but on a 2in floppy disc inside the camera. These cameras provide (in conjunction with a suitable video digitser) an extremely convenient way of acquiring images from the 'real world'. One firm currently developing such a

digitiser for use with the Canon Ion is DT Software. The digitiser makes use of the fact that the camera produces still pictures, so it can perform all of the hard work of decoding colour video in software, rather than with the hardware. This allows use of more sophisticated and accurate filters, resulting in better colour and sharper pictures than those made with existing digitisers.

A combination of software and hardware linking the Canon Ion camera and the computer allows full control of the camera's functions from

the desktop. The interface costs either £820 with the camera, or £350 on its own. Expect both to be available sometime in the new year. Contact DT Software on (0223) 841099.

Meanwhile, a low-cost colour digitiser has just been launched by Romeo. The Midi digitiser is compatible with the Archimedes/A3000 and can digitise images from any still video source. Software is provided to produce animations or slideshows. It costs £175 from Rombo Ltd. Tel: (0506) 466601.



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You can access the Archimedes desktop without pressing the keys on the keyboard – by using a touchscreen. We look at what is available

## SPREADSHEETS ROUND-UP

Our popular Stepping Up series continues with a look at spreadsheet packages available for the A3000 and Archimedes

## SECONDHAND ARCS

With many Acorn users upgrading to the new A5000 computer, the market for secondhand 300 and 400 series machines is increasing. Read our guide to buying a used Arc

## PRIME ART

We look at the latest art and graphics package from Minerva which is aimed at primary school children

## PLUS

#### A - Z OF BEEB PROGRAMMING

A fascinating glossary of programming tips for your BBC eight-bit micro

## SQUEEZE IT

How do *Compression* and *ArcFS* programs compare when compressing files? We squeeze out the truth

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All faders up as we delve into the fascinating world of making and recording music on EMR's package

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Watch out for the February issue of BAU – available January 9 1991

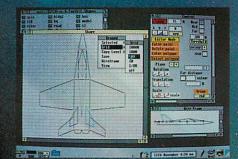
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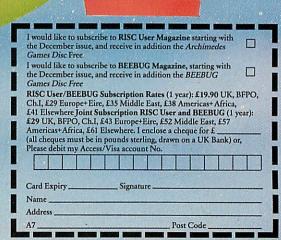


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## **IDE Hard Disc Upgrades**

## for the Archimedes & A3000

## What is IDE?

IDE (Integrated Drive Electronics) is the latest interface standard for connecting hard drives to personal computers and is used in the new Acorn A5000. Our drives all feature a memory cache system, which when coupled with our custom designed 16 bit interface give very fast access times indeed. Typically 50% faster than the Acorn ST506 drives used on the 300 & 400/1 ranges.

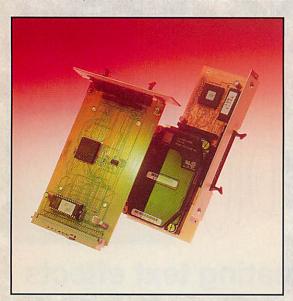
## What drive options are available? Archimedes 310, 440, 400/1 and 540.

Drive sizes currently available are 42, 89 and 105 Mbyte with a typical access time of 28ms for the 42Mb models and less than 20ms for the others.

These 3.5" drives are available as either internal or external units, and use our high speed 16 bit IDE interface card that fits in your podule backplane. External drives are attractively cased to match the computer and have their own internal power supply and fan. One interface card may be used to control both an internal and an external drive.

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Our A3000 external solutions consist of the 16 bit IDE podule in a special metal podule box which fits to the back of your A3000 (under the monitor stand). Drive sizes are 42 Mb, 89 Mb or 105 Mb. We are also able to offer internal IDE drives for the A3000 that fit into the internal podule slot. These special 2.5" drives are available in 20, 42 and 89 Mb formats and have access times of 23ms.





These are 2.5 inch hard drives mounted onto our interface card for fitting into a standard podule slot in a 310, 400 or 540 computer. They are particularly useful when you already have one internal hard drive and want another.

A3000 Internal Driv

## What does the future hold?

IDE is a relatively new interface standard, but has already gained massive support. It has been endorsed by Acorn in the A5000 and is clearly the way ahead for users of Acorn systems. The next few months will see drives up to 400Mbyte, with larger capacities, and devices such as tape-streamers following very soon. The future for IDE is very bright indeed.

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## £15 STAR LETTER

While using my Archimedes the other day, my mouse threw a complete wobbler and would only allow me to move the pointer left and right, stubbornly refusing to move it up and down

This has happened before and normally I have cured it by removing the mouse ball and cleaning it. However this didn't work so, reluctantly, I switched off my machine and tried again.

Nothing. Still the same problem. Picking the mouse up I moved the ball with my fingers and everything seemed fine, so why wouldn't it work on the mouse mat?

The answer was simple. The sunlight streaming through the window was falling on the mouse and, because the mouse case is not light tight, it was affecting the left hand photocell: shielding the mouse with my hand proved the point. This was made permanent by sticking some black felt around the outside of the mouse and now everything functions as normal.

I hope this helps any other readers who may be suffering from the same problem, without knowing the cause.

> John Scott Paterson Nyker Newcastle Upon Tyne

#### ACROSS THE DIVIDE

I was rather worried when I saw your reply to a query from Wayne Waterson in BAU December 91, concerning how to transfer the output from Draw, Paint and Edit to his PC/LaserJet combination at work. Your reply suggested, correctly, that he will need software such as MultiFS to get data on to PC/Dos format discs. You went on to suggest the use of Translator to convert them to and from Tiff, Giff and other PC formats.

Firstly, I should point out that the Acorn PrinterLJ printer driver for the printer in question can produce output directly to a PC disc file. This can simply be copied on to the PC, and sent straight to the printer using the command COPY <filename> PRN. Another



Dos command which may help is the PRINT command: PRINT <filename> sends the file to the printer in the background, allowing other Dos programs to run while printing continues.

If there is a large amount of print data then this procedure may not work because the amount of data in the file will be more that can fit on to a 640K floppy disc. In this case it can be directed to a large Ram disc, or hard disc on the Arc, and then the resultant file cut up by Edit into two smaller files. It could also be compressed by Spark into a PC Arc file, and then decompressed on the PC.

The PRINT command on the PC will allow the two files to be printed one after the other. As an example, a standard letter, printed at 150dpi, is around 151k in size and takes 52sec to print out. At 300dpi its size is 592k and it takes around two minutes to print.

Secondly, I should point out that Translator is only suitable for bitmap files, and does not support draw files. The PC world has a large number of Draw type file formats, and no clear standard. Also, in its more recent public domain versions, Translator is a conversion application from Giff, Tiff and so on, to Acorn sprite format, but does not offer conversion the other way. Creator, usually supplied with it, will take sprite files and create the specified file format. Finally, can I recommend the use of the Postscript printer driver for DTP and text files. Postscript is far more efficient and a smaller file is created.

Patrick McTiernan Cricklade Swindon

The large file problem is something we at BBC Acorn User have to cope with regularly. This month's scanners piece (page 151) was printed using four colour separations and the files amounted to around 12Mb per page, the large size being due to the amount of data in the scanned sprites. These files were cut up into smaller 640K chunks and then transferred, via a PC, on to a Macintosh. This was connected to a Linotronic typesetting machine (a Postscript printer which prints at high resolution on to transparent film).

The reconstitution of these files was achieved using the Dos COPY command, in the form of COPY File1+File2+File3 BigFile. This takes each file in turn and adds it to BigFile.

#### **NETTING A BIG ONE**

We have ten Archimedes in the college where I teach and I have found them to be an invaluable educational tool.

However, what I would like to do is set up some sort of network, so that we can have shared storage space and work on large projects. As a college I would also welcome the

chance to share our beleaguered laser printer.

Fine, you may think. What's the problem? Well, it is this although I am quite prepared to fiddle around with hardware, I would like some sort of guidance. Have you ever covered the topic in BAU?

Katrina Temple High Barnet London

BBC Acorn User has had network articles before, but we think it is time to start a network series. This should provide all the advice you are looking for.

## TREASURE TROVE

Many people have been complaining about the lack of games conversions from the Amiga, but what about the lack of games ported from the BBC Model B.

Apart from the superb new version of Elite, few games have been converted. There are some classics that would bear the crossing well, such as Exile, The Sentinel, Revs and the often forgotten Cholo which really deserves to be rendered in colour on the Arc.

Admittedly the Amiga version of Exile wasn't that brilliant, but then the Amiga Elite isn't as good as Hybrid's version. I'm not saying that we should not transfer games from the Amiga, merely that we should not forget the treasure trove of games that already exist in the Acorn market.

Peter Gouldborn Putney London

## FINAL POINT?

I read with interest the letter from Sam Wauchope, Director of Acorn Computers Ltd. I especially liked the sentence, ...the A5000 is testament to the fact that we have an excellent product to offer you, which admirably complements the entire range of Acorn Computers'.

I have no doubt he knows what he is talking about and so I would be most grateful to know in what way the A5000 compliments my recently purchased Archimedes A440?

> **David Williamson Bognor Regis**



Q I have recently purchased Elite for my Archimedes. It seems to run okay, but when I return to the desktop the mouse pointer has frozen and I have to press CTRL-BREAK before I can use my computer again. Is this a problem with Elite, or my computer?

> James Lee Norwich

This is actually due to a A This is actually minor bug in Risc OS itself and depends on how the setting of MOUSESTEP is configured inside your Archimedes. To cure this, reset the computer and press F12. At the \* prompt enter **CONFIGURE MOUSESTEP 4 and** press RETURN. Then press CTRL-BREAK - this sets the value inside your computer's Cmos Ram, so that you won't need to repeat it each time you load the game.

When using Draw, I find When using Draw, it difficult to accurately position objects within a larger diagram. Can you advise?

> P. Lorimer Hackney, London

Although using the Grid option can help you to position objects more accurately, it doesn't always provide you with the fine movement required 'adjust' positions over small distances - for example, to move shapes up and down by single pixels. To overcome this, a feature that is often overlooked can be used.

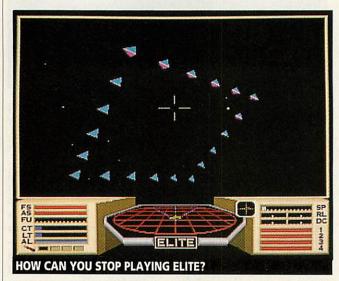
When you are dragging an object around the screen, the cursor keys can be used to move it by single pixels in each direction.

What is method of resetting the What is the easiest internal clock on the Archimedes?

> John Freeman Salisbury

There are two simple methods for doing this. The first is to load the Alarm application from Application disc 2, clicking the middle button over its icon and selecting Set clock. You can then amend the time by

# **QUESTIONS ANSWERS**



clicking on the relevant up and down arrow icons. When you are satisfied with the settings, click on OK.

A second method of setting the clock is to go into Basic by pressing F12 and typing \*BASIC. Then type PRINT TIME\$ which will show you the current time.

You can then change this by typing TIME\$="<the new time>" where <the new time> is in the same format as that shown by the PRINT statement. Type QUIT followed by RETURN twice, to get back to the desktop.

I have a number of fonts Q I have a number of but, to avoid problems when using Edit, I have split them into several directories, each containing a small number of fonts. Is there any way I can get one font directory to install those fonts stored in a different directory, so that software like Impression can see all of the available fonts?

> R. McCann Birmingham

A One way around this problem is to make each font directory daisychain another so that if, for example, you have font directories Fonts, Fonts2 and Fonts3, you can tell Fonts2 to also load Fonts1 and get Fonts3 to load Fonts2 (which in turn will load Fonts1). That way you can store less frequently used fonts in their own directories.

To do this, it is simply a case of changing a line in each Font directory's !Run file. First, locate and load Edit, then open the font directory by double clicking on it while holding the SHIFT key down. Load !Run into Edit by dragging it on to the Edit icon. Next, move the cursor down to the end of the line that reads:

SetMacro Font\$Path <Font\$Prefix>.

You should then add to the end of this line the exact filename of any other font directories, separated by a comma. For example, to modify the above line so that it installs Fonts2 (which is stored in the root directory of your hard disc) change it to the following:

SetMacro Font\$Path

<Font\$Prefix>.,:4.!Fonts2

Make sure you remember to insert the space either side of the comma. You can then amend other !Run files in a similar fashion.

have bought Q Amstrad SM2400 modem which I would like to use with my BBC B computer, but I do not have the correct lead. Can you help?

> Ron Greenaway Cheltenham

The Amstrad requires a A 5V line on the serial port, which you can obtain from the analogue port on the BBC. Firstly, wire up a lead as follows:

Beeb S2400 Tx Pin 2 Rx Pin 3 RTS Pin 4 CTS Pin 5 0v Pin 7

Then take a piece of wire from pin 1 of the analogue port (5V) and connect it to pin 20 of the modem.

I have recently transferred some of my tape based programs on to disc, but when I try to run them I get the 'No Room' error. What is going wrong?

A. Walters Clapham, London

When you have installed, it When you have a disc claims a bit of your memory for its workspace. However, this is only needed when you are actually loading the program. Once loaded, your program can reclaim any 'lost' memory.

To do this you need to move your program to the position where it would normally reside on a tape-based machine. This is normally at PAGE=&E00. You can add a few lines to the end of your Basic programs to automatically do this for you, so that in future your program will run as normal. The lines you need to add are;

1 IF PAGE<>&E00 THEN GOTO 10000

10000 \*KEY 0\*TAPEIMFORA%-=0TO(TOP-PAGE)STEP4:A%!&E-00=A%!PAGE:NEXTIMPAGE=&E-00IMOLDIMRUNIM

10010 \*FX138,0,128 10020 END

Line 1 will check to see if the program is located at &E00. If it is not, the short routine at line 10000 will be executed, which will move the program to &E00 and then run it. If your program has more than 10000 lines you can change the lines above, but remember to change the GOTO as well.

There are Q desktop publishing-type numerous packages around for the Archimedes, but I still have my trusty Model B. Could you tell me if there are any DTP packages available for my Beeb?

> Robert Higgs Chelmsford

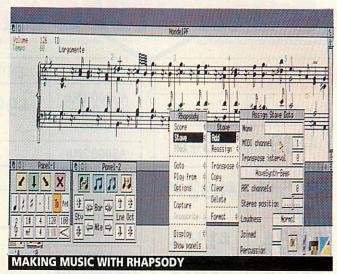
A yes - In lact, quite a few to choose Yes – in fact, there are from. Probably the most comprehensive is Wapping Editor from Watford Electronics, which has a host of features including working on virtual documents from disc and different scalable fonts. Pixel Perfect from AVP Computing is another DTP-type package which is easy to use and has a range of useful features.

I am writing a short program on the Archimedes which I would like to use to reset my machine, as if CTRL-BREAK had been pressed. Is it possible to perform this task via software? And if so, how?

> N. Willison Cardiff

You should be careful A You should be about resetting the machine using software, as other tasks will be killed, with possible loss of data. But the following snippet of code can be added to your program. To reset the machine, simply CALL code%

DIM code% 100 FOR pass%=0 TO 2 STEP 2



P%=code% [ OPT N% MOV 0, #200 MOV 1,#3 MOV 2,#0 SWI "XOS Byte" MOV 0, #58720256 LDR 1, [0] STR 1, [1,-1] SWI "XOS\_EnterOS" TEQP PC, #-6710886 MOV PC, #0

At school we would like to transfer some BBC software to the BBC A3000 and we have been told that using the serial port is the simplest method. Is there any easy-to-use, multi-tasking software to enable us to do this?

> L. Gooch Preston

Firstly, you will need to A fit the optional serial link chips, which your dealer can fit. A company called Ivoryash Ltd produces a multi-tasking wimp serial link between the A3000 and BBC eight-bit computers. This way you can drag the files you require from one directory viewer to another, in a similar fashion to copying files on the Archimedes. Ivoryash can be contacted at 14 Perwell Close, Bredon, Tewkesbury, Glos. GL20 7LJ. Tel: (0684) 73173.

I have just bought a BBC A3000 computer and would like to know what packages exist for helping me to learn and compose music? I

don't have a Midi interface yet, but I intend to add one.

S. Scott Bournemouth

Maestro, a fairly com-A Maestro, a music proprehensive music program is supplied free with the A3000, and allows you to create quite complex compositions using standard musical notation, with the notes laid out graphically on a five-note stave. You can also add a Midi interface and send the notes to an external musical instrument if you wish. However, Maestro can be limiting if you want to create complex harmonies and change your instruments in mid-tune.

Rhapsody from Clares is similar to Maestro - it can read existing data files and offers other features, such as the ability to print out complete scores and control multiple instruments.

I have a 1982 BBC Q Model B and have recently purchased a Universal type teletext adaptor manufactured by Ground Control.

The adaptor was purchased secondhand - so I cannot expect too much, but basically I cannot get it to work at all. I have connected it up to my computer and connected it to the TV aerial, all to no avail. I have a feeling that I need some software to drive everything. Maybe you can suggest a suitable remedy.

N Levens Oxford

A lt could be teletext adaptor can be It could be that your controlled by the Advanced Teletext Rom. If this is the case, then you are in luck.

The Advanced Teletext Rom was developed by BBC Soft, to replace the Acorn Teletext Filing System Rom that the Acorn Teletext adaptor was originally supplied with. Versions of the Advanced Teletext Rom are available as a plug-in Rom that goes into one of the BBC's sideways Rom sockets. You should be able to purchase this type of Rom from a dealer such as Watford Electronics. However if you have difficulty, you could try contacting the BBC Teletext Service at the BBC TV Centre in Shepherds Bush London W12.

The ATS Rom package comes with extensive documentation so you should be able to set it up without too great a problem.

## **HELP US TO HELP YOU**

The Questions and Answers page is your chance to have your problems solved. It can be on any topic - you name it and we'll try to solve it. Please send your questions, whether technical or otherwise, to:

> **Questions and Answers BBC Acorn User** 20-26 Brunswick Place London, N1 6DJ.

We are happy to answer your queries on these pages, but regret that we are unable to send personal replies to questions sent in. If you send a disc, please put your name and address on the disc itself. It is also useful if you could include full details of your machine. Please enclose an SAE where necessary and mark on your envelope whether you use a BBC eight-bit micro or 32-bit Acorn A3000/Archimedes



# - Golfeyes Follywers



| ARCHIMEDES               |          |         |           |
|--------------------------|----------|---------|-----------|
| SYSTEM                   | ENTRY    | COLOUR  | MULTISCAN |
| A3000                    | £599     | £819    | £849      |
| A3000<br>Learning Curve  | £642.29  | £885.05 | £892.29   |
| A420/1<br>Learning Curve | £1114.83 | £1334   | £1364     |
| A540/1                   | £2495    | £2715   | £2745     |

| SYSTEM                                 | ENTRY                                    | COLOUR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | MULTISCAN |
|----------------------------------------|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| A5000 1Mb<br>RAM floppy<br>drive       | £999                                     | £1219                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | £1249     |
| A5000 2Mb<br>RAM 40Mb HD               | er p <u>arti</u> milita                  | on particular sectors in a contract of the con | £1499     |
| A5000<br>Learning<br>Curve             | uenr<br>mare<br>mare<br>mare             | order of series por se | £1531.06  |
| A5000<br>Learning Curve<br>and Printer | 10 10 10 10 10 10 10 10 10 10 10 10 10 1 | divinity ned<br>a resolution and                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | £1765.96  |

| A3000 ACCESSOR           | RIES |
|--------------------------|------|
| 3.5" External Drive      | £97  |
| Monitor Stand            | £15  |
| External Podule Case     | £12  |
| Serial Upgrade           | £16  |
| A3000 Technical Manual   | £28  |
| Dust Cover Micro/Monitor | £5   |
| Dust Cover Micro         | £9   |
| User Port/Midi Upgrade   | £44  |
| UHFTV Modulator          | £29  |

| 710000 10011 | ilical mariaal            | 220  |
|--------------|---------------------------|------|
| Dust Cover I | Micro/Monitor             | £5   |
| Dust Cover I | Micro                     | £9   |
| User Port/M  | idi Upgrade               | £44  |
| UHFTV Mod    | lulator                   | £29  |
|              | UPGRADES FO<br>ARCHIMEDES | R    |
| A3000        | Upgrade to 2Mb RAM        | £49  |
| A3000        | Upgrade to 4Mb RAM        | £164 |
| A305         | Upgrade to 1Mb RAM        | £48  |
| A305/A310    | Upgrade to 2Mb RAM        | £229 |
| A305/A310    | Upgrade to 4Mb RAM        | £419 |
| A410/1       | Upgrade to 2Mb RAM        | £37  |
| A410/1       | Upgrade to 4Mb RAM        | £99  |
|              |                           |      |

| CONCEPT KEYBOARDS                     | 3    |
|---------------------------------------|------|
| A4 Standard Keyboard inc BBC Software | £115 |
| A3 Standard Keyboard inc BBC Software | £140 |
| A4 Archimedes Keyboard                | £116 |
| A3 Archimedes Keyboard                | £141 |

Upgrade to 8Mb RAM

Upgrade to 4Mb RAM

Upgrade to 8Mb RAM

Upgrade to 8Mb RAM

Upgrade to 8Mb RAM

£725

£72

£679

£569

£569

A410/1

A420/1

A420/1

A440/1

R140

|          | PLO1  | TERS            |       |
|----------|-------|-----------------|-------|
| ROLAND   |       | SKETCHMATE-     | £316  |
| DXY-1100 | £498  | GRX-300         | £2560 |
| DXY-1200 | £628  | GRX-400         | £3425 |
| DXY-1300 | £830  | DPX & GRX Inclu | ıde   |
| DPX-2500 | £2348 | 12 months on-s  | ite   |
| DPX-3500 | £2960 | maintenance     |       |

## **ARCHIMEDES ACCESSORIES**

| NEW Multitasking RISC OS             | £28  |
|--------------------------------------|------|
| 3.5" 800K 2nd Floppy Drive (305/310) | £109 |
| 5.25" 800K External Floppy Drive     | £84  |
| I/O Podule                           |      |
| (Analogue & User Port & 1MHz Bus)    | £75  |
| MIDI add-on to I/O Podule            | £27  |
| MIDI Expansion Card                  | £64  |
| Econet Network Board                 | £43  |
| IEEE Interface Adaptor               | £265 |
| 16 Bit Parallel I/O Card             | £193 |
| Software Developers Toolbox          | £147 |
| Floating Point Unit                  | £449 |
| SCSI Adaptor Expansion Card          | £159 |
| Keyboard Extension Lead              | £5   |
| 2 Podule Backplane                   | £24  |
| 4 Podule Backplane                   | £37  |

# HARD DISK DRIVES (ST506) 20Mb for 410 ST506 £159 40Mb for 410 ST506 £235 53Mb for 410 ST506 £POA A3000 20Mb + Podule £335 A3000 40Mb + Podule £449

# SCSI HARD DRIVES FOR A400 Supplied complete with controller card. 52Mb Internal £348 105Mb Internal £549 170Mb Internal £829

£899

210Mb Internal

| COMMUNICATIONS           |      |
|--------------------------|------|
| Amstrad SM2400 V22BIS    | £109 |
| Miracom WS4000           | £96  |
| Miracom WS3000 V22BIS    | £221 |
| Pace Linnett Plus        | £98  |
| Pace Linnett 1200 V22    | £153 |
| Pace Linnett 2400 V22BIS | £189 |
| Pace Linnett 32          | £366 |
| Hearsay comms software   | £48  |
| BBC/Master Modem Cable   | £14  |
| Archimedes Modem Cable   | £14  |

## BBC MASTER SYSTEM

Acorn Master 128 Computer Cumana CDX400 Dual Drive Microvitec Colour Monitor Two Tier Monitor Stand.

£679

## BBC B and MASTER ACCESSORIES

| £113     |
|----------|
| £44      |
| £12      |
| £13      |
| £13      |
| ) P.O.A. |
| £31      |
| £47      |
|          |

## MASTER 128 CUMANA DISC DRIVES

| DISC DRIVES                    |            |
|--------------------------------|------------|
| 5.25" 200K Single 40T No PSU   | £64        |
| 5.25" 200K Single 40T With PSU | £79        |
| 5.25" 400K Single 40/80        |            |
| Switchable No PSU              | £79        |
| 5.25" 400K Single 40/80        | Territoria |
| Switchable With PSU            | £89        |
| 5.25" 400K Dual 40T No PSU     | £125       |
| 5.25" 400K Dual 40T With PSU   | £149       |
| 5.25" 800K Dual 40/80          |            |
| Switchable No PSU              | £159       |
| 5.25" 800K Dual 40/80          |            |
| Switchable With PSU            | £179       |
| 3.5" Single Drive No PSU       | £64        |
| 3.5" Single Drive With PSU     | £79        |
| 3.5" Dual Drive With PSU       | £125       |
| 3 5" + 5 95" 40/80 Switchable  | £169       |

## Are You Considering Buying a Mono Scanner?

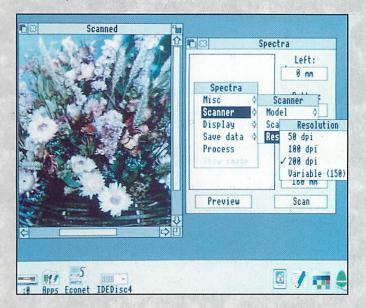
Before buying a mono scanner consider that with *Spectra* you can scan 256 grey scale mono, as well as full colour. When making comparisons, bear in mind that *Spectra* scans automatically, and therefore should be compared with mono scanners with sheet feeder if available. Equivalent 256 grey scale mono scanners with sheet feeder would cost £350 (A6), and £1000 (A4) making *Spectra* extremely competitive.

## Possible Applications

School/college magazines, brochures, letterheads, title screens, house details for estate agents, maps, logos, colour tone (e.g. temperature) analysis, 24-bit image processing (processing/analysis software not supplied), photo databases e.g. family albums.

#### Ease of Use

Spectra is a revolution in colour scanning systems for the Archimedes, A3000 and A5000. Its clever design means that Spectra is as simple to use as you could possibly want, but as powerful as you will ever need, producing professional results first time, every time.



In its simplest mode, all you need to do to grab a full colour image is place the original under the scanner, load the supplied software and click on 'Scan'. This will scan the original in an amazing 16 million colours and then automatically convert the data using Acorn's powerful ChangeFSI system into a 256-colour RISC OS sprite that will be displayed on screen. The sprite can be saved, printed or dragged to any package supporting the import of sprite files, including all popular DTP packages.

| Price Information |                            |         |  |  |
|-------------------|----------------------------|---------|--|--|
| Order code        | Model                      | Price   |  |  |
| 0118              | Spectra - Archimedes/A5000 | £549.00 |  |  |
| 0119              | Spectra - A3000 Internal   | £549.00 |  |  |
| 0117              | Spectra - A3000 External   | £569.00 |  |  |

All prices exclude VAT. If ordering direct from RISC Developments, please add VAT & £9 for insured carrier delivery. The A3000 internal model (code 0119) will be available early 1992, the other models are available now.

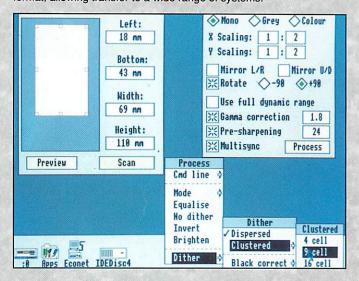


117 Hatfield Road St. Albans Herts, AL1 4JS Tel. 0727 40303 Fax. 0727 860263

This advert was produced using **Ovation** - the professional DTP system from RISC Developments.

## Choice of Sixteen Million Colours, 256 Greyscale or Black & White Scanning

For more advanced use you can specify the resolution and choose between monochrome, grey and full colour images before scanning. After the scan is completed, a wide range of image processing parameters can be altered to provide full control over features such as gamma correction, pre-sharpening, output mode, scaling and dithering. The image can then be stored as a 256-colour RISC OS sprite, or as 24 bits per pixel file using the industry standard TIFF format, allowing transfer to a wide range of systems.



Scanning images smaller than the maximum area couldn't be simpler. A quick preview scan will show a rough of the image in the main scanning window. You can then select the area to be scanned by dragging the margins on screen, or for absolute control you can enter the measurements directly. To make life even easier, you can choose one of three methods for displaying the scanning dimensions and choose between millimetres and inches.

#### Completely Multi-Tasking

To avoid the annoying wait associated with some colour scanners, *Spectra* is fully multi-tasking throughout the scanning process. As data is read, it is stored directly to disc, or buffered through memory, the buffer size being fully configurable. In either case, the effect on other applications' performance is hardly noticeable.

Whilst the Spectra range can be used with any RISC OS system, a minimum of 2Mbytes of RAM and a hard disc drive is recommended to make full use of the features.

## **Technical Specification**

Scanner: Sharp JX100

Scanning time:

Interface: RS232 Serial, 115200 baud Interface card: Half-width, high speed serial card Scanning system: Motorised scanning head

Scanning system: Motorised scanning hea Scanning method: Reflective CCD sensor

Illumination: Calibrated white-light fluorescent lamps
Scanning modes: Monochrome, 256 grey scales &

full colour (16 million levels)

Scanning area: 100mm by 160mm (maximum)

Resolution: 50-400 dots per inch (201-400 dpi are simulated)
Software: Low-level driver code in EPROM

Low-level driver code in EPROM on interface card, RISC OS compliant

application, supplied on disc 40 seconds (Monochrome preview)

(at 18°C) 6 minutes (Full colour, 3 passes at 100 dpi)
Documentation: 48 page A5 user guide - wire bound
Contents: Scanner, interface card, power supply,

ents: Scanner, interface card, power supply, user guide, application disc, dust cover

RISC Developments reserves the right to change the specification without prior notice.

#### Your dealer for RISC Developments' products is:

# Spectra

High Quality Scanner System for Colour, Greyscale and Monochrome Images



## THE INTELLIGENT CHOICE **FOR**

SPECIALISTS in the supply of **COMPUTERS** to PRIMARY, SECONDARY and TERTIARY **EDUCATION** 

## ARCHIMEDES SOFTWARE

| ART/DESIGN/GRAPHICS                 |           | LANGUAGES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |           |
|-------------------------------------|-----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
| Artisan II                          | £92       | ANSI C Rel 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | £122      |
| Atelier                             | £63       | Assembler                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | £145      |
| Autosketch II                       | £66       | Fortran 77                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | £75       |
| Gamma Plot                          | £38       | ISO-PASCAL                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | £75       |
| Graph Box                           | £57       | LISP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | £145      |
| Mogul                               | £18       | Prolog X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | £145      |
| Poster                              | £77       | SILICON VISION                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | D143      |
| Pro Artisan                         | £71       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 0000      |
| Render Bender 2                     |           | Arc PCB Professional                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | £269      |
| Sigma Plot                          | £38       | Gerber Plot                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | £91       |
| Sigilia Piot                        | F30       | nearth of the state of the stat | £132      |
| DATABASES                           |           | Risc Basic                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | £72       |
| AlphaBase                           | £34       | Robo Logo                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | £52       |
| Genesis                             | £64       | Solid Cad                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | £115      |
| Multistore                          | £192      | Solid Render                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | £115      |
| Multistore                          | E192      | Solid Tools                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | £269      |
| DESKTOP PUBLISHING                  |           | Super Dump                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | £19       |
| Acorn DeskTop Publisher             | £125      | Super Plot                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | £28       |
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| Impression II                       | £131      | Intersheet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | £23       |
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| lempest                             | L73       | Sigmasheet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | £38       |
| INTEGRATED                          |           | Viewsheet                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | £44       |
| Desktop Office                      | £96       | WORDPROCESSORS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | The Paris |
| Logistix                            | £77       | 1st Word Plus II                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | £68       |
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| ripeuream 3                         | TIIO      | Interword                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | £23       |
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| LEISURE software. Call for details. | VILU UIIU | View                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | £44       |
| ELISONE SOICHTUIC. CONTON CECONS.   |           | TICTY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | בירע      |

## LASER PRINTERS

|                           | PPA | ٨ |       |                            | PPA | ٨ |        |
|---------------------------|-----|---|-------|----------------------------|-----|---|--------|
| Brother HL-4              | 4   | * | £598  | Kyocera F800T              | 8   | * | £929   |
| Brother HL-4V             | 4   |   | £710  | Laser Direct               | 6   |   | £844   |
| Brother HL-8e             | 8   |   | £939  | NEC Silentwriter 2 S60P    |     |   |        |
| Brother HL-8V             | 8   | * | £1050 | P/Script                   | 6   | * | £1180  |
| Brother HL-8PS            |     |   |       | NEC Silentwriter 2 290     |     |   |        |
| Postscript                | 8   | * | £1386 | P/Script                   | 8   | * | £1408  |
| Canon LBP-4 Plus          | 4   | * | £584  | NEC LC890XL Postscript     | 8   | * | £2330  |
| Laser Direct Hi-Res Card  |     |   |       | NEC Colourmate PS P/Script |     | * | £3590  |
| for LBP4                  |     |   | £319  | OKI Laser 400 0.5Mb        | 4   | * | £490   |
| Mannesman Tally           |     |   |       | OKI Laser 800 0.5Mb        | 8   | * | £870   |
| MT 904                    | 4   | * | £540  | OKI Laser 840 P/Script 2Mb | 8   | * | £1200  |
| Canon LBP-8111 Plus       | 8   | * | £975  | Panasonic KXP4420          | 8   | * | £629   |
| Canon LBP-IIIT Dual Bin   | 8   | * | £1356 | Panasonic KXP4450i         |     |   |        |
| Canon LBP-IIIR Dual Bin   |     |   |       | Dual Bin                   | 11  | * | £935   |
| Duplex                    | 8   | * | £1460 | Panasonic KXP4455 D/Bin    |     |   |        |
| Epson EPL-4100            | 6   | * | £574  | P/Script                   | 11  | * | £1466  |
| Epson EPL-7500            |     |   |       | QMS PS410 Postscript       | 4   |   | £1330  |
| Postscript                | 6   | * | £1178 | QMS PS810 + Postscript     | 8   |   | £1989  |
| HP Laserjet IIIP          | 4   | * | £699  | Sharp JX9500H              | 9   | * | £639   |
| HP Laserjet III           | 8   | * | £1025 | Star LP-4                  | 4   | * | £573   |
| HP Laserjet IIID Dual Bin |     |   |       | Star LP-4PS Postscript     | 4   |   | £796   |
| Duplex                    | 8   | * | £1740 | Star LP-8 III              | 8   |   | £936   |
| IBM 4019E XL              | 5   |   | £735  | Star LP-8 III Starscript   |     |   | _,,,,, |
| IBM 4019 XL               | 10  |   | £990  | P/Script                   | 8   | * | £1158  |

All printers marked by an \* include 12 months on-site maintenance.

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| DFX-8000                | £1985               | Nec P70                    | £429 |
| LQ-200                  | £169                | Nec P90                    | £638 |
| LQ-450                  | £175                | Panasonic KXP1170          | £105 |
| LQ-570                  | £214                | Panasonic KXP1123          | £135 |
| LQ-870                  | £372                | Panasonic KXP1124i         | £180 |
| LQ-860 Colour           | £456                | Panasonic KXP1695          | £279 |
| LQ-1010                 | £275                | Panasonic KXP1624          | £279 |
| LQ-1070 ≠               | £320                | Panasonic KXP 2624 Colour* | £356 |
| LQ-1170                 | £441                | Panasonic KXP1654*         | £340 |
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| SQ-2550                 | £628                | LC20                       | £105 |
| Hew/Pack Thinkjet*      | £270                | LC200 Colour               | £150 |
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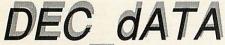






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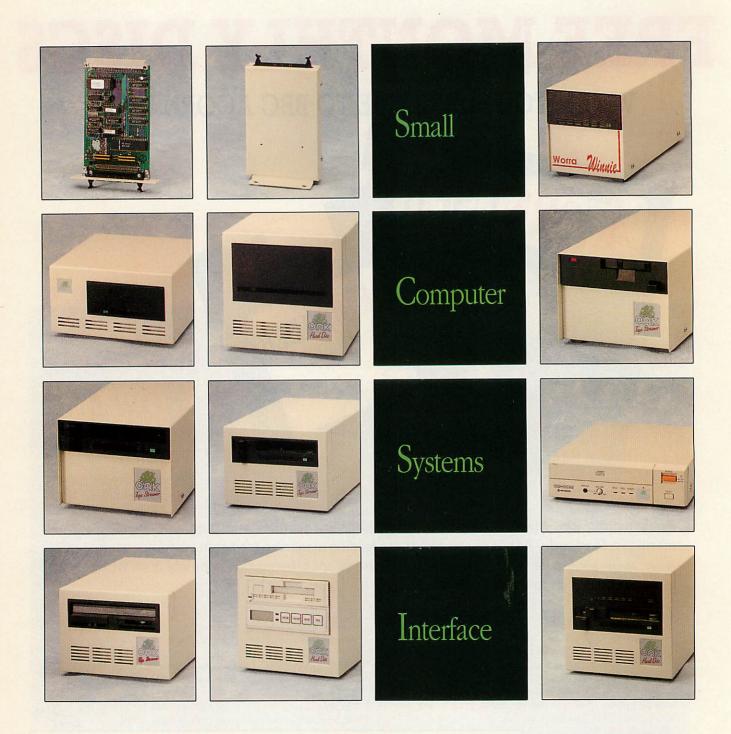
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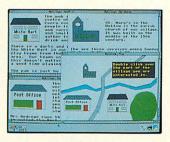
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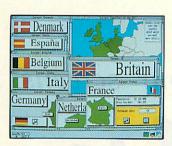


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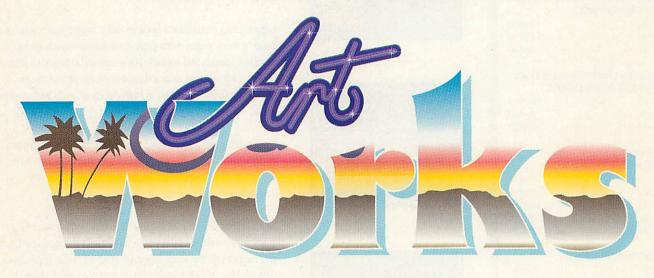
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|-----------------------------------------------------|------|
| <ul> <li>R303-A3000 – to 2MB RAM Upgrade</li> </ul> |      |
| (expandable to 4MB)                                 | £65  |
| • R304-A3000 - to 4MB RAM Upgrade                   | £139 |
| • R311-A305 - to 1MB RAM Upgrade                    | £30  |
| • R312-A305/310 - to 2MB RAM Upgrade                | £149 |
| • R314-A305/310 - to 4MB RAM Upgrade                | £265 |
| ● R412-A410/1 — to 2MB RAM Upgrade                  | £35  |
| ● R413-A420/1 — to 4MB RAM Upgrade                  | £64  |
| ● R414-A410/1 - to 4MB RAM Upgrade                  | £98  |
| ● R810-A410/1 — to 8MB RAM Upgrade                  | £599 |
| ● R820-A420/1 — to 8MB RAM Upgrade                  | £569 |
| ● R840-A440/1 — to 8MB RAM Upgrade                  | £499 |
| R814-R140 - to 8MB RAM Upgrade                      | £499 |
|                                                     |      |

0% Finance & Special Teachers/Academics' prices Now available on A3000L/C and A5000 L/C Micro Systems

#### Convert your Archi 410 to a 420 or 440 with Watford's unique Upgrade Kits

| UP10 - | to 2MB RAM + 20MB Hard Disc | £165 |
|--------|-----------------------------|------|
| UP15 - | to 2MB RAM + 40MB Hard Disc | £252 |
| UP20 - | to 4MB RAM + 20MB Hard Disc | £232 |
| UP30 - | to 4MB RAM + 40MB Hard Disc | £318 |
| UP40 - | to 4MB RAM + 53MB Hard Disc | £438 |
|        |                             |      |

| Graphics, A           | Art, | Design & Gam                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | es         |
|-----------------------|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------|
| GRAPHICS              |      | Olympics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | £15        |
| ARCtist               | £19  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | £17        |
| ARCticulate           | £19  | Pirate                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | £16        |
| Atelier               | £65  | Power Band                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | £18        |
| Artisan II            | £45  | Puncman 1 & 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | £16        |
| Artisan Gallery       | £16  | Puncman 3 & 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | £16        |
| Autosketch II         | £65  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | £15        |
| Craftshop 1 & 2       | £28  | The state of the s | £10        |
| Euclid 2              | £50  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | £22        |
| Graph Box             | £59  | Real McCoy 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | £23        |
| Graphbox Professional | £118 | Redshift                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | £14        |
| HotLink Presenter     | £40  | Return to Doom                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | £16        |
| Kermit                | £46  | Revelation                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | £54        |
| Mogul                 | £17  | A STATE OF THE STA | £15        |
| Poster                | £79  | Rotor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | £19        |
| Pro Artisan           | £70  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | £19        |
| Prime Art             | €69  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | £25        |
| Render Bender         | £58  | A STATE OF THE PARTY OF THE PAR | £24        |
| Snippet               | £21  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | £14        |
| Tween                 | £21  | Superior Golf                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | £15        |
|                       |      | Super Pool                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | £19        |
| GAMES                 |      | Talisman                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | £12        |
| Air Supremacy         | £20  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | £19        |
| ARCticulate           | £19  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | £11        |
| Apocalypse            | £15  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | £24        |
| Arcade 3 Compil.      | £12  | Maria de Britania de Carlos de Carlo | £22        |
| Arcade Soccer         | £15  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | £15        |
| Arc Trivia            | £18  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | £23        |
| Avon                  | £16  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | £15        |
| Blowpipe              | £16  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | £15        |
| Boogie Buggy          | £19  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | £13        |
| Break 147             | £19  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | £16        |
| Bug Hunter            | £14  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |
| Caverns               | £14  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |
| Chess 3D              | £14  | A CONTRACTOR OF THE CONTRACTOR | £59        |
| Chocks Away           | £14  | Control of  | £38        |
| Chocks Away Extra     |      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | £64        |
| Conqueror             | £18  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 260        |
| Cops                  | £14  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | £6         |
| Corruption            | £18  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | £17<br>£65 |
| Crisis                | £21  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |            |
| Elite                 | £33  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | £44        |
| Enter the Realms      | £19  | Equasor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | £47        |

| LIS | vvoliuscape          | LIU  |
|-----|----------------------|------|
| £14 |                      |      |
| £14 | Miscellaneous        |      |
| £14 | Ancestry             | £59  |
| £14 | Arccomm 2            | £38  |
| £14 | Arcterm 7            | £64  |
| £18 | Armadeus Sound       | £60  |
| £14 | BBC DFS Reader       | £6   |
| £18 | Blowpipe             | £17  |
| £21 | Broadcaster Loader   | £65  |
| £33 | Compression (CC)     | €44  |
| £19 | Equasor              | £47  |
| £21 | FlexiFile            | 298  |
| £14 | Genesis              | £65  |
| £13 | Genesis 2            | £113 |
|     | Hearsay Comms        |      |
| £13 | Pack                 | £50  |
| £15 | Investigator 2       | £22  |
| £19 | JX Archi Colour Prin | ter  |
| £19 | Driver for Citizen & |      |
| £13 | Star                 | £15  |
| £13 | Numerator            | 266  |
| £15 | Presenter 2          | £35  |
| £14 | Presenter Story      | £145 |
| £26 | Rainforest           | £17  |
| £15 | Revelation           | £58  |
| £25 | Rhapsody in Blue 2   | £45  |
| £27 | Speech!              | £15  |
| £22 | The Victorian        | £17  |
| £16 | Time Tabler          | £549 |
| £39 | Toolkit (Clares)     | £35  |
| £16 | Touchtype            | €40  |

Tracer

Tracker

Vox Box

WorldScape

£46

£39

£47

£17

£15

£19

#### **Archimedes Hard Disc**

Watford's ST506 Hard disc drives for A310 & A410 series fit internally into the space provided.

P.S. A310 upgrades require a backplane and a fan.

| 3HDP – Hard Disc Podule only             | £135 |
|------------------------------------------|------|
| • 3HD20 - 20Meg H' Disc + Podule for 310 | £235 |
| • 3HD40 - 40Meg H' Disc + Podule for 310 | £345 |
| • 3HD50 - 53Meg H' Disc + Podule for 310 | £474 |
| 4HD20 - 20Meg Hard Disc for 410          | £129 |
| 4HD40 - 40Meg Hard Disc for 410          | £215 |
| 4HD50 - 53Meg Hard Disc for 410          | £335 |
| A3000 20Meg Hard Disc + Podule           | £299 |
| A3000 40Meg Hard Disc + Podule           | 6420 |

For Archimedes IDE Hard Disc turn to page 14

| Desk Top Publisher        |      |
|---------------------------|------|
| Acorn's Archi DTP Package | £108 |
| Equasor                   | £39  |
| Impression 2 DTP Pack     | £130 |
| Impression Junior         | £72  |
| Expression-PS             | £19  |
| Tempest DTP Package       | £90  |

#### More Archimedes Products See Pages 3, 5, 6, 8, 10, 14

#### **Archi Wordprocessors**

| Pendown Archi     | £48 | Archie Spell Master £2 |     |
|-------------------|-----|------------------------|-----|
| Wordwise + Disc   | £24 | PD Spellchecker        | £40 |
| Image Writer      | £25 | View                   | £45 |
| Interword Disc    | £24 | Graphic Writer         | £19 |
| 1st Word Plus - 2 | £63 | EasiWord               | £18 |

#### **Databases**

| AlphaBase         | £36   | Magpie           | €40  |
|-------------------|-------|------------------|------|
| Knowledge Organis | er£42 | Multistore v2.01 | £185 |

#### **Spreadsheets**

| Intersheet Disc | £24 | Schema | £89 |
|-----------------|-----|--------|-----|
| Viewsheet       | £45 |        |     |

#### **Business Graphics**

| GammaPlot       | £39 | Sigmaplot | £39 |
|-----------------|-----|-----------|-----|
| Interchart Disc | £17 |           |     |

#### **Integrated Packages**

| • Logistix | £79 | • Pipedream 4 | £149 |
|------------|-----|---------------|------|
|------------|-----|---------------|------|

- Desktop Office Database, Graphs & Charts, Wordprocessor Spreadsheet, Communications
- Desktop Folio Wordprocessor, Desktop & Interactive Publishing. Ideal for school

#### A3000 I/O Card (User, Analogue & IIC)

This NEW versatile I/O Card from Watford, fits inside the A3000 and includes an Analog to Digital Converter, a User Port, and an InterIC (IIC) connector.

The card allows many of the peripherals developed for the BBC to be used with the Archimedes A3000. The ADC and User Port have the same pin out and connectors as the BBC computers.

Extensive RISC OS software is supplied to provide BBC OSBYTE calls for support of the ADC and User Ports, including the BASIC keyword ADVAL. The software provides extended RISC OS support for separate interrupts from both the ADC and User Ports, permitting easy interrupt driven operation.

The card is provided with all the software in ROM and is automatically loaded when the machine is turned on.

Peripherals connected to the ports can obtain up to 500mA of power at +5V. A fuse is fitted to the card to protect the A3000 from damage arising from accidental short circuit of the power output.

The card is provided with an extensive manual explaining installation, all software commands, connector pin outs, hardware addresses and example

- Features

  An 8 bit User Port with a standard 20 way IDC connector, compatible with the User Port on the BBC computers and the Archimedes I/O Podule.

  A 10 bit Analog to Digital Converter with a standard 15 way D type connector, compatible with the ADC on the BBC range of computers and the Archimedes I/O podule.

  An InterIC (IIC) Port with a 5 pin DIN socket to connect the A3000 to external IIC devices.
- £42

#### Archi Mouse Port Splitter

Our handy little splitter unit eliminates the risk of damaging your micro due to constant plugging and unplugging of the mouse by allowing you to connect both, a joystick and a mouse simultaneously to your Archimedes. £15

#### Silicon Vision

| £95      | Solids Render                 | £120                                                    |
|----------|-------------------------------|---------------------------------------------------------|
| £120     | Solid Tools                   | £279                                                    |
| £28      | Data Vision                   | £110                                                    |
| £22      | Share Holder                  | £135                                                    |
| sional   |                               | £275                                                    |
| Madellas |                               | £136                                                    |
|          | £120<br>£28<br>£22<br>ssional | £120 Solid Tools<br>£28 Data Vision<br>£22 Share Holder |

#### Archimedes to BBC Serial Link Mk 2

Using this simple data link, it is possible to solve all your BBC to Archimedes data transfer problems. The kit is supplied with a disk, and the necessary cable to connect the two computers. Only £15 New RISC OS Version

#### **Archimedes External Disc Drive Interface**

With this interface it is possible to connect almost any 5.25"/3.5" disc drive with its own power supply to the Archimedes. Upto 4 disc drives can be connected. Fully Buffered Board. NO SOLDERING is involved. Supplied complete with necessary lead. A300/A3000 £21 • A400

#### Special Education Prices

All education establishments qualify for special education prices on micros, etc. Please write in or telephone (0923) 37774 or 50335 for written quotation.

#### LANGUAGES (Archimedes)

| ISO-PASCAL; FOI  | RTRAN  | 177 £7         | 7 each |
|------------------|--------|----------------|--------|
| Assembler; LISP; | Prolog | X £14          | 9 each |
| ANSI C Rel. 3    | £125   | BASIC Compiler | £77    |
| Cambridge Pascal | £60    | Logotron Logo  | £45    |
| Macro Assembler  | €40    | Risc Basic     | £120   |
| Robo Logo        | £69    | Risc FORTH     | £110   |

FOR

#### 256 Grey-Scale Scanner

Watford proudly introduces its new innovative 256 grey-level hand scanner for the Archimedes range of micros. It offers up to 400 dpi scanning resolution, complete with software.

256 Grev-Scale Scanner is ideal for incorporating pre-drawn logos, artwork, photographs and sketches into desktop publishing documents and other graphics programs. Designed by our own R & D team, it offers the best overall scanning solution for Archimedes micro. Just compare the competition on our price and these outstanding features:

- Full 105mm 400dpi scanning operation in just 3mS per line! (Twice as fast as most scanners.)
- Selectable 256/16/4 grey levels
- Full scan preview, scale to fit windows
- Complete set of image enhancement tools
- Single width podule
- True brightness and contrast control
- Fast RISC OS printing
- · Five-function edge detection software, Laplace convolution matrix image enhancement, image smoothing, etc.

#### **Special Launch Price** £185

#### Minerva's Archimedes Software

| EasyWord      | £18  | Mailshot*     | £27 |
|---------------|------|---------------|-----|
| Home Accounts | £35  | Reporter*     | £27 |
| Time Tabler   | £549 | School Admin* | £65 |
| System Delta  | £59  |               |     |

€29 System Delta Program Reference Manual Requires System Delta to operate

Stand alone Business Accounts Packages Sales; Purchase; Order Processing and Invoicing; Nominal; Stock management

£79 per module

or Complete Business Package £325

#### ULTIMUM - Archimedes A3000 Podule Racking System



THE ONLY LOGICAL WAY TO **EXPAND YOUR A3000 COMPUTER** 

Price: £125

#### **ARM 3 Turbo Card**

#### Simply The Best



Here it is at last - the all new Mark 2 version of Watford's highly acclaimed ARM 3 processor board for the Archimedes and now also the A3000 series computers. Using the latest surface mount technology on a high quality four layer circuit board we have reduced the overall size to a mere 53mm x 45mm, and the cost to only £199. Mk II upgrade will increase the speed of your micro by a factor of 3 to 6.

Any competent A300 or A400/1 series micro owner can fit the upgrade himself, as we provide full fitting instructions and a special ARM chip extraction tool. However for A3000 micros and those not wishing to perform the upgrade themselves, we will collect, upgrade and return your micro by courier service, at an

(A300 and old A440 series owners please note – you will need to upgrade to MEMC1A for ARM3 to work.)

In response to our customers planning their seasonal budget, we have agreed to extend the ARM 3 £199 launch price over the holiday period until the middle of January 1992.

RRP £249

#### Offer Price £199

All our A3000 ARM 3 upgrades are fitted by Acorn approved Board level & surface mount technology Service Centre without invalidating the warranty.

#### BBC MASTER

MASTER 128K Micro incl. Acorn's View, Viewsheet, ADFS, BASIC Editor & TERMINAL plus FREE OFFER £399 (see below)

#### FREE OFFER



A 5.25" Double Sided, 40/80 track switchable 400K Disc Drive complete with cables and a Utilities disc incl. 2 games, plus

Gemini's OFFICE MATE & OFFICE MASTER packages on Disc consisting of: Database, Spreadsheet, Beebplot graphics. Accounts packs: Cashbook, Final Accounts, Mailist, Easyledger, Invoice & Statements, Stock Control.

FREE with every BBC Master purchased from us during December

#### Add-Ons & Accessories

| Econet Module for the Master       | £45          |
|------------------------------------|--------------|
| Twin ROM Cartridge for Master      | 63           |
| Quad ROM Cartridge for Master      | £14          |
| Master Reference Manual I          | (No VAT) £14 |
| Master Reference Manual II         | (No VAT) £14 |
| Master Advance Ref Manual          | (No VAT) £17 |
| 64K Upgrade Kit for B+             | £32          |
| Acorn 1772 DFS Kit complete        | £49          |
| ECONET Upgrade Kit for BBC B       | £42          |
| ALL ECONET UPGRADES Availab        | ile          |
| ARIES' IEEE Interface for BBC B &  | Master £238  |
| Morley Teletext Adaptor with ATS F | lom £99      |
| Ecolink                            | £270         |

#### Z88 Portable Micro



£179

#### FREE

With every Z88 purchased from us, we are giving away absolutely FREE, a Z88 to BBC Interface Link, 4 rechargeable batteries and a compact Mains Battery Charger worth £38.

#### **Z88 ACCESSORIES**

| The second secon | Charles and the last |             |       |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-------------|-------|
| • 32K RAM Pack or 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2K E                 | PROM Pack   | £16   |
| • 128K RAM Pack or                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                      |             | £32   |
| • 512K RAM Pack                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                      |             | £8€   |
| ● Z88 Eprom Eraser U                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Jnit                 |             | £38   |
| <ul> <li>Z88 Spellmaster for</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                      | dream       | £40   |
| <ul> <li>Z88 Carrying Case</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | OSTONE S             |             | 22    |
| <ul> <li>Z88 Computing Boo</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | k                    |             | £9.95 |
| <ul> <li>AA Nicad Recharge</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                      | Battery     | £1.50 |
| Battery Charger Co.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |             | 20    |
| <ul> <li>Z88 Serial Printer C</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                      |             | 21    |
| <ul> <li>Z88 Parallel Printer</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | Cabl                 | e           | £18   |
| ● Z88 to Archi Link                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |                      |             | £1!   |
| Z88 to BBC Link                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 83                   | • Z BASE    | £50   |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | £27                  | ● Z TAPE    | €4    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | £32                  | • Z TERM    | €4    |
| ■ 788 Maine Adaptor                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 69                   | • 788 Modem | £11   |

#### Archi Real-Time Digitiser



#### Now supplied with NEW RISC OS Version Software

Watfords' Archimedes Video Digitiser is the most sophisticated digitiser ever designed for a micro. It provides a fast and flexible means of capturing images from a video camera or recorder for display and manipulation on the Archimedes range of Micros. Off-air televison signals may also be digitised via a video recorder or TV tuner. Please write for further details

#### Price £155

A Set of Colour Filters for colour image grabbing using a video camera New Risc-OS Software Upgrade £39

#### Archi Graphic Tablet



The Archi Graphic Tablet offers performance and accuracy comparable to other tablets priced at well over £400, and has the useful addition of a liftable cover, which can hold tracing material or menu templates securely. The package is supplied complete with sophisticated Archi software. (Now, fully LinCAD compatible. Recommended by Linear Graphic for use in Education). (FREE this month, PC Mouse Drivers

& Art package)

#### Special Price £199

(Price includes Tablet, Leads, Software & Puck) Stylus Optional Extra £15

Archi Graphic Tablet Junior. Working area 9" x 6". Price includes Stylus £125

#### **Disc Plonker** Rack

When using ones micro, there is a tendency to have more than one Disc on the desk. This exposes them to



desk. This exposes that the heard of fingerprints, scratches, dust, coffee and an untidy desk. Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. Holds up to eight 5.25" discs

Protection at Only: £2

#### Acorn & Watford DFSs

| Watford sophisticated DFS ROM                              | £16.00 |
|------------------------------------------------------------|--------|
| Watford DFS Kit complete                                   | £69.00 |
| <ul> <li>We will exchange your existing ROM for</li> </ul> |        |
| Watford's ultimate DFS ROM at only                         | £12.00 |
| DFS Manual (comprehensive)                                 | £6.95  |
| Acorn DNFS ROM                                             | £17.00 |
| Acorn ADFS ROM only                                        | £25.00 |
| Acorn 1772 DFS ROM Kit                                     | £49.00 |
| (The single Density DFS system is now old                  |        |

technology. Like Acorn, Watford too have decided to replace it with the their more up-to-date 1770 DDFS interface. We have informed most of the software houses of this decision in order that they can ensure compatibility with our highly sophisticated and fully Acorn compatible DDFS).

#### Watford's MkII 1772

#### Single/Double Density DFS

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our Mk II DDFS Board with its 1770 Disc Controller has been adapted to allow the use of Acorn ADFS as well. It also has all the commands of the Acorn's 1770 DFS, plus the added features.

Added features include:

- Acorn ADFS compatible Use ADFS on our DDFS board.
- Tube host Code No longer any need to have the DNFS in your machine to use Co-Processors, even the CoPro and Master 512.
- Auto 40-80 Track sensing no need to fuss with 40/80 track switches (even works with protected disks)
- An extremely powerful 8271 emulation ensuring compatibility with almost all software.
- New low profile small footprint board.
- Fits with all third party ROM boards.
- Option to double the speed of file handling operations - BPUT and BGET.
- Operates in both single and double density
- OSGBPB has been recoded, increasing still further the speed of file handling.

Please note that not all DDFS's are capable of providing either the full 80% storage increase or of allowing a file the full size of the disk – Ours allows both of these!

If you already have a DDFS (any manufacturer), and wish to upgrade to our MkII version, then simply return your existing ROM and DDFS board and we will supply the new DDFS for only £39.00.

• SPECIAL PRICE

(No VAT) £6.95 DDFS Manual

 We will exchange your existing DFS Kit for our sophisticated DDFS for only
 £30. £30.00

Please note, as the MkII DDFS is a hardware and sofware upgrade, it is not possible for existing Watford DDFS users to simply exchange the ROM for the new version.



#### 3M - Diskettes

3M - SCOTCH Diskettes with Lifetime warranty from Watford Electonics your 3M Appointed Distributor

| • 10 x 5.25" S/S D/D 40T (744)             | £5  |
|--------------------------------------------|-----|
| • 10 x 5.25" D/S D/D 40T (745)             | £5  |
| • 10 x 5.25" S/S D/D 80 Track (746)        | £7  |
| • 10 x 5.25" D/S D/D 80 Track (747)        | £7  |
| • 10 x 5.25" 1.6M D/S D/D High Density for | IBM |
| XT and AT                                  | £9  |
| • 10 x 3.5" S/S D/D 40/80 Track            | £7  |
| • 10 x 3.5" D/S D/D 40/80 Track            | £7  |
| • 10 x 3.5" Double Sided High Density      | £13 |



# Top Quality 3.5" & 5.25" Diskettes

To complement our range of Quality Discs and Disc Drives. WE are now supplying SPECIAL OFFER packs of 10 Lifetime guaranteed discs. Each disc has a reinforced hub ring. Supplied complete with selfstick labels and a Plastic Library Disc Box.

| ● 10 x M3 3.5" D/S D/D 80 Track    | £7         |
|------------------------------------|------------|
| ● 10 x M9 3.5" D/S High Density    | £12        |
| ● 10 x M4 5.25" S/S D/D 40 Track   | £5         |
| ● 10 x M5 5.25" D/S D/D 40 Track   | £5         |
| ● 10 x M7 5.25" D/S D/D 80 Track   | £7         |
| ● 10 x M8 5.25" D/S H/D Hi-Density | £9         |
| M2.3" Double Sided                 | £2.50 each |



CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

#### **Quality Disc Drives from** Watford

All our Disc Drives are Double Sided and will operate in both Single and Double Density modes. All 5.25" Disc Drives are 40/80 track switchable. For ease of use, the switches are front mounted.

Various UK "manufacturers" of disc drives for the BBC Micro (more accurately, "packagers" label other manufacturers drives with their own name). We buy the high quality NEC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.

If you look around the popular BBC Micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.

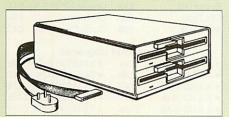
Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. Ideal for Schools & Colleges.

When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space. Your BBC Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double Plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with a Watford plinth. (Turn to the 6th page of our advert for the Plinths).
P.S. All our 5.25" Disc Drives with PSU are compatible with the Compact Micro. All you require

is our special Compact Disc Drive cables designed by us.

#### "Test Bureau Approved for Use in Education"





#### Our Disc Drives conform to BS415

| Туре       | Description                                    |      |
|------------|------------------------------------------------|------|
|            | Disc Drive without                             | PSU  |
| • CLS400S: | Single, 40/80 track 400K<br>Double sided Drive | £72  |
| •CLD800S:  | Twin, 40/80 track, 800K<br>Double sided Drives | £142 |
|            | Disc Drive with PS                             | U    |
| • CS400S:  | Single, 40/80 track, 400K                      |      |

**Double sided Drives** £155

• CD800S:

Special Cable to connect both 3.5" and 5.25" Disc Drives simultaneously to the BBC Compact £13

Double sided Drive

Twin, 40/80 track, 800K

£82

#### Disc Drive/DDFS Offer



- The popular CLS400S 40/80 track switchable disc drive.
- Watford's popular Mk II DDFS Interface (allows up to 720K storage). Will run both in single & double density modes
- A comprehensive DFS Operating manual Bargain at Only £116 (Offer valid until stocks last)

#### 3.5" DISC DRIVE



These top quality 3.5" Double sided, 80 track, are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc.

| Туре            | Description                   |      |
|-----------------|-------------------------------|------|
|                 | Disc Drive without PSU        |      |
| • CLS35:        | Single Disc Drive, 400K       | £62  |
| • CLD400S:      | Twin Disc Drives, 800K        | £109 |
|                 | Disc Drive with PSU           |      |
| • CS35:         | Single Disc Drive, 400K       | £83  |
| ● CD35:         | Twin Disc Drives, 800K        | £126 |
| (P.S. CS35 is s | upplied in a twin case with a |      |

blanking plate to enable easy expansion to a dual drive at a later stage)

#### Disc Drive Sharer



#### (Ideal for educational establishments)

A low cost alternative to the Econet system.Watford's Intelligent Disc Drive Sharer allows you to connect 3 BBC Micros (model B, B+ and Master series) to a single or double disc drive. Running under any DFS or DDFS, this intelligent unit will automatically queue the computers. Each computer has a status light dedicated to it. If it is green you will get immediate access to the disk, and red means that you are next in line. The unit plugs directly into the disc drive socket on each computer and is powered by the mains. (N.B. Not for use with

Price includes 3 Cables

#### Disc Drives in Monitor Stand



• CDPM 800S - Twin 5.25", 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC B & Master 128K micros. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use.

£165

• DP35 800 - Same as above except, one disc drive is a 5.25" and the other is 3.5".

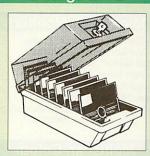
£154

#### Floppy Head Cleaner Kit

The heads in floppy drives are precision made and very sensitive to dirt. The use of Cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. it is very simple to use. Available in 3.5" & 5.25", please specify.

Price £4

#### Antistatic Lockable Disc Storage Units



Gives double protection - Strong plastic case that

affords real protection to your discs.

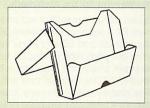
Antistatic helps avoid data corruption whilst in storage. The smoked top locks down.

Dividers and adhesive title strips are supplied for efficient filing of discs.

| M35 - holds up to 50 5.25" discs | €4.95       |
|----------------------------------|-------------|
| M85 - holds up to 95 5.25" discs | £6.95       |
| M25* - holds up to 25 3.5" discs | €4.95       |
| M50 - holds 50 3.5" discs        | €6.50       |
|                                  | THE RESERVE |

 M10 – holds 8 of No. 10 Data Cartridges £15 Not lockable

#### Plastic Library Cases



Holds up to 10 x 3.5" Discs. £1.50 Holds up to 10 x 5.25" Discs. £2.00

#### **Dust Covers** (For our Disc Drives)

| Single CLS (without PSU) | £3.20 |
|--------------------------|-------|
| Single CS (with PSU)     | £3.25 |
| Twin CLD (without PSU)   | £3.85 |
| Twin CD (with PSU)       | £3.90 |

#### **Disc Albums**

Attractively finished in black leather-look vinyl. Stores up to 20 discs. Each disc can be seen through the clear view pocket.

£4

#### Special Bulk Offer on Discs

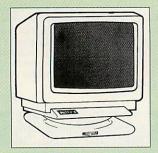
(Supplied packed in Anti-Static Lockable Storage Units) (Lifetime warranty on Discs)





#### **BULK PACK DISCS in lots of 100**

|                     | S/S        | D/S   | D/S   |
|---------------------|------------|-------|-------|
| Туре                | 40T        | 40T   | 80T   |
| Without Sleeves 5.2 | 5" £30     | £35   | €40   |
| With Sleeves 5.25"  | £33        | £38   | £43   |
| 3 5" D/S D/D        | 220 for 50 | 050 6 | - 100 |



#### **Microvitec Monitors**

| • 1431 - Standard Resolution Monitor | £169  |
|--------------------------------------|-------|
| • 1451 - Medium Resolution Monitor   | £209  |
| Cub3000 Medium Res for A3000         | £189  |
| • 1441 - High Resolution Monitor     | £359  |
| Dust Cover for Microvitecs           | £5.50 |
| Touchtec 501 Touch Screen            | £239  |

Now 3 years Parts & Labour warranty on all Microvitec Monitors

#### Multiscan Colour

| • Eizo 9060S | £389     | NEC 6FG       | £1525 |
|--------------|----------|---------------|-------|
| • Eizo 9070S | £579     | • Taxan 770LR | £362  |
| NEC 3FG      | £370     | • Taxan 775   | £366  |
| NEC 4FG      | £465     | • Taxan 795   | £402  |
| NEC 5FG      | £850     | Taxan 875     | £669  |
| VIDC Enhance | er Board |               | £25   |

(P.S. Taxan 795 monitor is supplied with a FREE VIDC enhancer board)



#### Aries AlphaScan Monitor

Pound for Pound, the AlphaScan VGA Multiscan monitor provides the maximum performance and greatest flexibility of any 14" colour monitor for the Archimedes micro.

Its multiscan circuitry provides automatic adjustment for frequencies between 30 and 60KHz horizontal, and 50 and 90Hz vertical. Its 0.28mm dot pitch high resolution tube provides super sharp text graphics, while a high speed (70/72Hz) refresh rate provides a flicker-free display easing the eye strain. The Multivideo VIDC Adaptor supplied (free) with the monitor allows high resolution operation in all screen modes. £325

#### **Philips Monitors**

| BM7502 12" Hi-res Green Monitor    | £67  |
|------------------------------------|------|
| BM7522 12" Hi-res Amber Monitor    | £67  |
| CM8833 14" Med. Res Colour Monitor | £165 |
| TV Tuner for CM8833 Monitors       | £62  |
| Dust Cover for Philips Monitors    | 26   |

#### STAR BUY

 PHILIPS 14" Medium Res, dark glass, attractively finished Colour Monitor. A pushbutton switch toggles between Hi-Res monochrome green text mode and full colour display. (Please state the type of Connecting Lead you require).

ONLY £163

#### **Refurbished Monitors**

| Philips 14" Refurbished Colour Monitors, |      |
|------------------------------------------|------|
| same specification as the 'Star Buy'     |      |
| Monitors above                           | £119 |
| (Offer valid while stocks last)          |      |

#### **Spare Monitor Leads**

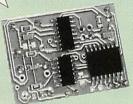
| BNC Lead for Zenith or Philips | £3    |
|--------------------------------|-------|
| Skart Monitor Lead             | £5    |
| RGB lead for TAXAN Monitors    | £3    |
| Archimedes Colour Monitor Lead | £7.50 |

#### Anti Glare VDU Screen

These extremely effective, easy to install, 12" & 14" VDU screens eliminate harmful glare, improves contrast on colour monitors. Increases productivity in offices. A must for wordprocessor users.

£12





This unique VIDC add-on board for the Archimedes, caters for all types of Multiscan and VGA monitor and mode requirements. There are 2 versions to suit and mode requirements. There are 2 versions to suit all requirements. The multimode software supplied, provides all the new modes for the selected monitor type, including the now standard Computer Concepts modes. With VGA monitor, you are no longer restricted to a few modes. A WIMP application supplied on disc, allows new modes to be designed and existing modes to be modified for be designed and existing modes to be modified for particular monitors.

Super VGA VIDC Card: This provides support for both VGA and Multisync monitors. A unique electronic design allows the horizontal and vertical sync to be buffered and have the polarity changed

under software control

MultiVideo VIDC Card: As above but for MultiScan monitors only. £25

#### Panasonic Printers



| • KX-P1123  | £133 | • KX-P1624 | £278  |
|-------------|------|------------|-------|
| • KX-P1124i | £177 | • KX-P1654 | *£385 |
| • KX-P1170  | £105 | • KX-P1695 | £278  |
| • KX-P1180  | £96  | • KX-P2624 | *£355 |
|             |      |            |       |

\* Price includes 12 months On-site warranty

#### Panasonic Accessories

#### **Cut Sheet Feeders**

670 P37 - 1123/70/80 669

| P38 - P1624/95; P2624            | £129 |
|----------------------------------|------|
| Buffers                          |      |
| P12 4K Buffer Board for KX-P1081 | £55  |

32K Buffer P1123/24/70/80 P1540/92/95; P1624/54/95 £16

#### **Serial Interfaces**

P19 for P1123/24/24i/70/80/1624/54/95/2624 £49

#### Citizen Printers

C100 124D Printer

C145

120D Plus

| 1200 1 103   | 2100        | IL-TD I IIIIC |            |
|--------------|-------------|---------------|------------|
| PN-48        | £209        | Swift 24E C   | olour £249 |
| Swift 9      | £145        | Swift 24X     | £299       |
| Prodot Cut   | Sheet Feede | er            | £120       |
| Swift 24 Co  | our Option  |               | £29        |
| Swift 24 Rib |             | ck £4         | Colour £13 |
| Swift 24X C  |             |               | £125       |

#### Integrex Colour Jet

| 14/0   |
|--------|
| £6.50  |
| £10    |
| £21    |
| £12.40 |
| £55    |
| £123   |
|        |

#### **Star Printers**

| • LC15        | £173     | LC200 Colour      | £146 |
|---------------|----------|-------------------|------|
| • LC20        | £103     | SJ48 Inkjet       | £179 |
| • LC24-10     | £137     | • XB24-200 Colour | £299 |
| • LC24-15     | £275     | • XB24-250 Colour | £359 |
| • LC24-200    | £168     | XB24 Colour kit   | £29  |
| •1 C24-200 Co | lour£207 | ZA200 Colour      | £236 |

#### **Star Accessories**

#### **Cut Sheet Feeder**

| LC10/200/24-10 | £65 | LC15/LC24-15 | £125 |
|----------------|-----|--------------|------|
| XB24-10        | 083 | XB24-15      | £139 |
|                |     |              |      |

#### **Serial Interfaces**

| SPC-10 | LC10; LC10-II; LC10-Col; LC15;     |     |
|--------|------------------------------------|-----|
|        | LC24-10; LC24-15; LC-200; LC24-200 | £49 |
| 8K Ser | LC-200; LC24-200; FR10; FR15;      |     |
|        | XB24-10; XB24-15                   | €64 |

#### **Paper Roll Holders**

| LC-200; | LC24-200; | LC24-200 colour | £29 |
|---------|-----------|-----------------|-----|
|         |           |                 |     |

32K Ram Card for LC/XB24-10; 15; LC200 £55

#### Ribbons

| LC10; LC10-II; LC15 | Black £4; | Colour £6  |
|---------------------|-----------|------------|
| LC-200; LC24-200    | Black £5; | Colour £12 |
| XB24-10; XB24-15    | Black £5; | Colour £12 |

#### **Laser Printers**

#### All Laser Printers include 12 months On-site maintenance

| Canon LBP-4+                                     | 4ppm        | £575  |
|--------------------------------------------------|-------------|-------|
| Canon LBP-8 III                                  | 8ppm        | £975  |
| Canon LBP-8 IIIR                                 | 8ppm        | £1445 |
| Canon LBP-8 IIIT                                 | 8ppm        | £1345 |
| Epson EPL4100                                    | 6ppm        | £575  |
| Epson EPL7500                                    | 6ppm        | £1165 |
| HP Laserjet III                                  | 8ppm        | £1015 |
| HP Laserjet IIID                                 | 8ppm        | £1720 |
| HP Laserjet IIIP                                 | 4ppm        | £705  |
| HP Laserjet IIISi                                | 4ppm        | £2475 |
| HP Laserjet Illsi                                | 16ppm       | £2475 |
| Panasonic KX-P4420                               | 8ppm*       | £629  |
| Panasonic KX-P4450i*                             | 11ppm*      | £945  |
| <ul> <li>Panasonic KX-4455 Postscript</li> </ul> | 11ppm*      | £1455 |
| Star LP-8 III 2                                  | 8ppm        | £1249 |
| Star LP-8 III                                    | 8ppm        | £915  |
| Star LP-8 Star(post)script                       | 8ppm        | £1149 |
| Star LP-4                                        | 4ppm        | £565  |
| Star LP-4PS Postscript                           | 4ppm        | £779  |
| * Now with 2 years On-si                         | te warranty |       |

#### **Laser Toners**

| £46 | KX-P4420/50            | £19                                                    |
|-----|------------------------|--------------------------------------------------------|
| £13 | Laserjet HP IIP & IIIP | £42                                                    |
| £82 | Laserjet II/D, III/D   | £48                                                    |
| £56 | Qume Crystal (3)       | £42                                                    |
|     | £13<br>£82             | £13 Laserjet HP IIP & IIIP<br>£82 Laserjet II/D, III/D |

#### Laser RAM Upgrades

| • IIP & III 1MB | £56 | • EPL7100 256K | £39  |
|-----------------|-----|----------------|------|
| • IIP & III 2MB | £88 | • GQ5000 512K  | £42  |
| • II & IID 1MB  | £64 | • KX4420/50 1M | £75  |
| • II & IID 2MB  | £99 | • KX4420/50 2M | £115 |
|                 |     |                |      |

• KX4420/50 4M £195 • II & IID 4MB £146 • Canon LBP4 1M £105 • Star LP8 1M £139 • Canon LBP8 2M £125 Star LP8 2M £275

#### Laser Drum & Developer

| Epson Drum       | GQ5000 | £93 | EPL7100   | £129 |
|------------------|--------|-----|-----------|------|
| • Panasonic 4420 | ) Drum | €60 | Developer | £59  |
| • Panasonic 4450 | ) Drum | £93 | Developer | 280  |
| Qume Drum        |        | £76 | Developer | £56  |
|                  |        |     |           |      |

#### Jetpage Postscript Cartridge IID & IIID £240 • HP IIP/III £239

#### Various Add-Ons

| £139 |
|------|
| £399 |
| £235 |
| £229 |
| £259 |
| £28  |
| £129 |
| £145 |
|      |

#### **Hewlett-Packard Printers**

| • # Desk Jet 500                       | £275 | Paintjet XL    | £1089 |
|----------------------------------------|------|----------------|-------|
| Desk Jet 500 Col.                      | £499 | Quiet Jet Plus | £384  |
| <ul> <li>Desk Jet Cartridge</li> </ul> | £14  | HP Think Jet   | £265  |

Paint let Colour \$435

# Now 3 years extended Parts & Labour warranty

| <ul> <li>Paintjet Cartridges</li> </ul>  | Black    | £19;     | Colour   | £25    |
|------------------------------------------|----------|----------|----------|--------|
| <ul> <li>Desk Jet 500 256K RA</li> </ul> | AM cartr | idge     |          | £129   |
| • HP Epson FX Emulation                  | on Cartr | idge for | Desk Jet | €59    |
| Dock let Unlimited /Br                   | ook No   | VATI     |          | C10 75 |

#### Canon Bubblejet Printers

|         |             |             | D'ble | Ink  |
|---------|-------------|-------------|-------|------|
|         | Printer     | CSF         | Bin   | Cart |
| BJ10EX  | £192        | £43         |       | £16  |
| BJ300   | £340        | £88         | £65   | £12  |
| BJ330   | £385        | £110        | £79   | £12  |
| Spare E | Battery pac | k for BJ10E |       | £33  |

#### **NEC Pinwriter Printers**

| • P20 | £176 | ● P70 | £403 |
|-------|------|-------|------|
| • P30 | £214 | • P90 | £599 |
| • P60 | £324 |       |      |

**Cut Sheet Feeders** 

P20 £59; P30 £75; P60 £85; P70 £129

#### **Epson Printers**

| DFX5000      | £1069 | LQ1060 Colour | £599 |
|--------------|-------|---------------|------|
| DFX8000      | £1949 | LQ1070        | £322 |
| FX850        | £268  | LQ1170        | £438 |
| FX1050       | £342  | LQ2550+       | £679 |
| LQ200        | £155  | LX400         | £104 |
| LQ450        | £172  | LX850         | £144 |
| LQ570        | £210  | LX1050        | £219 |
| LQ860 Colour | £449  | SQ850         | £432 |
| LQ870        | £369  | SQ2550        | £635 |
|              |       |               |      |

#### **Cut Sheet Feeders for**

| £69  |
|------|
| £130 |
| £159 |
| £390 |
|      |

#### **Tractor Feed for**

LQ800 £44; LQ850/FX850 £69; LQ1050/ FX1050 £85; LQ2500 £90; LQ2550 £90.

#### **Accessories**

| EX800/1000 Colour Option          | £45 |
|-----------------------------------|-----|
| EX800/1000 Colour Ribbon          | £14 |
| LQ2500 Colour Option              | £65 |
| Multifont Card for LQ550/850/1050 | £95 |

#### **Epson Printer Interfaces**

All these interfaces fit inside the printer RS232 RS232 + 2K Buffer £52

#### **Printer Leads**

| BBC Centronics 4' long                 | 25     |
|----------------------------------------|--------|
| BBC Centronics 6' extra long           | £7     |
| Compact's Special Centronics Lead      | £7     |
| Nimbus Centronics Lead                 | 26     |
| IBM/Archimedes Parallel Lead 6'        | £4     |
| IBM/Archimedes Parallel Lead 5 metres  | £10    |
| IBM/Archimedes Parallel Lead 10 metres | £15    |
| Double Ended 36 way Centronics Lead 4' | £7     |
| Double Ended 36 way Centronics Lead 6' | 63     |
| MSX Centronics Parallel Lead 4'        | £12    |
| RS232 Leads (Various)                  | P.O.A. |
| IBM Keyboard extension lead coiled     | CE.    |

#### **Concept Keyboards**

| Standard A3 Keyboard with BBC Software | £143 |
|----------------------------------------|------|
| Standard A4 Keyboard with BBC Software | £117 |
| Archi A3 Keyboard                      | £144 |
| Archi A4 Keyboard                      | £118 |

#### **Plotters**

| • HP7440A                         | £415                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | • HP7475A                      | £592  |
|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------|-------|
| • HF / 440A                       | The state of the s | Plotters                       | 1592  |
|                                   | noianu                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | Piotters                       |       |
| • DXY1100                         | £499                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | • DXY1200                      | £629  |
| • DXY1300                         | £830                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | • DXY2500                      | £2349 |
| • DPX3500                         | £3289                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | <ul> <li>Sketchmate</li> </ul> | £315  |
| <ul> <li>Roland plotte</li> </ul> | er Pens. Fib                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | ore tip                        | £7.50 |

#### Listing Paper (Perforated)

| • 1,000 Sheets 9.5" x 11" Fanfold Paper      | £7  |
|----------------------------------------------|-----|
| • 2,000 Sheets 9.5" x 11" Fanfold Paper      | £11 |
| • 1,000 Sheets 9.5" x 11" NCR 2 Part Fanfold | £21 |
| • 1,000 Sheets 15" x 11" Fanfold Paper       | £9  |
| • 2,000 Sheets 15" x 11" Fanfold Paper       | £16 |
| • 1,000 Sheets true A4 Fanfold Paper 70gms   | £11 |
| • 2,000 Sheets true A4 Fanfold Paper 70gms   | £21 |
| Teleprinter Roll (Econo paper)               | €4  |

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50, 2K Sheets £3.00

#### **Printer Labels**

#### (On continuous fanfold backing sheet)

| 1,000 90 x 36mm (Single Row) | £6.00 |
|------------------------------|-------|
| 1,000 90 x 36mm (Twin Row)   | £6.25 |
| 1,000 90 x 49mm (Twin Row)   | £7.50 |
| 1,000 102 x 36mm (Twin Row)  | £6.75 |

#### Laser Printer Labels on A4 Sheets

| 3750 70 x 29mm (3 Rows) | £13.50 |
|-------------------------|--------|
| 3000 70 x 37mm (3 Rows) | £13.25 |
| 2625 70 x 42mm (3 Rows) | £13.00 |

#### **Printer Ribbons & Various Dust Covers**

| Type                  | Ribbons | <b>Dust Covers</b> |
|-----------------------|---------|--------------------|
| BBC Micro             | _       | £3.50              |
| BBC Master            | _       | £4.00              |
| Archimedes Micro pair | -       | £9.00              |
| Citizen 120D          | £2.75   | £4.50              |
| DMP2000               | £2.75   | £4.75              |
| DMP4000               | £3.75   | £4.85              |
| EX800/1000            | £3.50   | £5.00              |
| RX/FX80/85/800/MX80   | £2.95   |                    |
| FX/MX/RX100/1000      | £3.95   |                    |
| Kaga/Taxan KP810/815  | £3.25   | £5.00              |
| LQ400/500/550/800/850 | £3.25   | £6.00              |
| LQ1050/LQ2500         | £4.00   | <u> </u>           |
| LX80/86/800/850       | £2.75   | £4.50              |
| LX400                 | £3.50   | £5.00              |
| M1009/GLP             | £2.95   | £3.75              |
| NEC P2200             | £4.50   | £5.00              |
| Panasonic KX1080/81   | £3.25   | £4.75              |
| Panasonic KX-P1124    | £7.00   | £5.00              |
| Star LC24-10          | £2.95   | £6.00              |
| Olivetti Ink Jet      |         |                    |
| Cartridges (set of 4) | £6      |                    |
|                       |         |                    |

#### **Original Panasonic Ribbons**

|       | Guaranteed to   | last 3 | B million characters |     |
|-------|-----------------|--------|----------------------|-----|
| P110  | for KX-P1081,   | 1592   | & 1595               | 26  |
|       | for KX-P1180    |        | P145 for KX-P1124    | £7  |
| P140  | for KX-P1540    | 83     | P155 for KX-P1624    | 83  |
| Colou | r Ribbons for K | X-P1   | 081, 1592 & 1595     |     |
| Brown | n, Blue or Red  |        | £9 ea                | ach |

#### Professional Printer Stand



The professional printer stand takes printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is

printer functions is effectively halved. Its ergonomic design ensures smooth paper flow and automatic refolding

> 80 Column version £24 (carr. £3) 132 Column version £29(carr. £4)

#### Universal **Printer Sharers/Changer**

Connect up to 5 Micros to 1 printer or 5 printers to 1 Micro with our combined, Sharer/Changer switch

#### **Standard Low Cost Type**

| Connects | Serial | Paralle |
|----------|--------|---------|
| • 2 to 1 | £10    | £11     |
| • 3 to 1 | £13    | £14     |
| • 5 to 1 | £16    | £17     |
|          |        |         |

#### Professional Type

| Connects | Serial | Parallel |
|----------|--------|----------|
| • 2 to 1 | £17    | £18      |
| • 3 to 1 | £22    | £25      |
| • 5 to 1 | £34    | £38      |

#### 2 Way Compact Printer Switch

A handy 2 way printer switch. Enables one micro to be connected to 2 printers or vice versa. Parallel £18; Serial £17 (Cables extra at £6 each)

#### **Auto Printer Sharer Switch**

| Connects | Serial | Parallel |
|----------|--------|----------|
| 2 to 1   | £40    | £45      |
| 4 to 1   | £62    | £49      |
| 8 to 1   |        | £89      |

#### 256k Multi Spooler

These Auto Parallel Printer Sharers have built-in 256K of Printer Buffers. They can be used as Auto Sharers, Printer Buffers or both.

| • 2 ln/2 out | £135 | • 4 ln/2 out | £169 |
|--------------|------|--------------|------|
| • 8 ln/1 out | £199 |              |      |

#### **Compact Converter Units**

Serial to Parallel £36 Parallel to Serial £37

#### Laser Direct



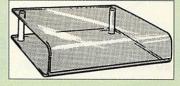
 Laser Direct Qume 6ppm complete £825

 Special High Res Card 600 DPI for Canon LPB 4 & LPB 8 Laser Printers £325

. LPB 4 Printer plus High Res Card £899

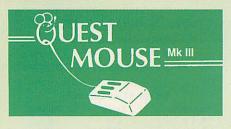
LPB 8III Printer plus High Res Card £1299

#### Perspex Printer Stand



Give your Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand.

80 Column version £16 (carr £3) 136 Column version £20 (carr £4)



| Quest Mouse III & Quest Paint                                                                                                                          | £59 |
|--------------------------------------------------------------------------------------------------------------------------------------------------------|-----|
| <ul> <li>Quest Mouse III, Quest Paint, AMX</li> </ul>                                                                                                  |     |
| Stop Press & Pagefont                                                                                                                                  | £89 |
| Quest Mouse III only                                                                                                                                   | £30 |
| Quest Paint Software only                                                                                                                              | £34 |
| Quest Font Disc (22 Text Fonts)                                                                                                                        | £15 |
| Quest Mouse Mat (Red or Blue or                                                                                                                        |     |
| Green please specify)                                                                                                                                  | £3  |
| <ul> <li>Quest Colour Dump Disc – This new<br/>software allows you to print direct from<br/>Quest Paint to your Integrex Colour<br/>Printer</li> </ul> | £18 |
| (P.S. Quest Paint is not compatible with BBC Compact)                                                                                                  |     |

Quest Paint is the winner of the BBC Acorn User 1990 Award for the Best Art/Graphics software



Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.

ConQuest ROM Package £30
(Price includes software in ROM and a comprehensive Manual).

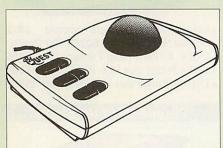
(Not Compatible with BBC Compact)

#### **ARCHI MK II MOUSE**

An extremely reliable replacement mouse for Archimedes Micro £32

#### Quest - Tracer ball

An attractively finished, extremely reliable, mouse replacement, input device. Requires very little desk space. Connects directly to your BBC B, BBC Master or Archimedes Micro.



QT-10 BBC/Master Version £27 QT-20 Archimedes Version £30

#### RB2 Marconi TRACKER BALL

| RB2 (AMX/Quest compatible) | £45 |
|----------------------------|-----|
| RB2 including Quest Paint  | £75 |
| RB2-A for Archimedes       | €46 |

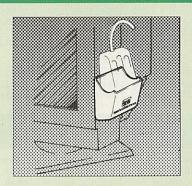
# THE NEW Mk III AMX MOUSE

#### AMX Mouse plus Super Art £54

(Please specify for BBC, Master or Compact)

| AIVIX MOUSE OINLY               | 129 |
|---------------------------------|-----|
| AMX SUPERART Package            | £29 |
| AMX STOP PRESS – A Desktop      |     |
| publishing software. Works with |     |
| Keyboard, Joystick or a mouse   | £25 |
| PAGE-FONTS - Over 20 Fonts for  |     |
| use with AMX Pagemaker          | £13 |
| AMX DESIGN (ROM)                | £34 |
| AMX XAM Educational             | £15 |
| AMX EXTRA EXTRA                 | £16 |
| AMX MAX A gem of desktop (ROM)  | £20 |
| MOUSE MAT                       | 63  |

#### **WE Mouse House**



Treat your mouse to a cosy Mouse House. This handy little gadget solves the problem of where to store your mouse when it is having a rest. Made of sturdy plastic, the WE Mouse House attaches to the side of your computer, monitor, disc drive or desk.

It protects it from damage when not in use, yet within easy reach when you need it again. At  $\mathfrak L4$  it does not cost a rodent's ransom.

Price £3



Our Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted. (Price includes FREE software Disc and Operating Manual)

Only £19

#### **Fleet Street Editor**

| Software pack for BBC Compact | £22 |
|-------------------------------|-----|
| Fonts N Graphics Disc Utility | £13 |
| XTRA Admin                    | £12 |
| Walt Disney                   | £12 |

# BEEB VIDEO DIGITISER



"Test Bureau Approved for Use in Education"

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro. This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket. The software supplied includes a sophisticated, fast screen dump routine.

Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem. The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds

#### £109 (Carr. £5)

(BBC B+ and Master compatible, except Master with Econet)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)

#### The Beeb HandScan

Hand-held Scanner for the BBC Micro



Watford Electronics are pleased to announce the launch of the first hand held scanner for the BBC Micro. HandScan is a compact unit which will allow photographs, diagrams, or any other documents to be digitised quickly and easily, to then be used in a desk top publishing package, art program, or even in your own Basic programs! These useful devices have been available for faster and more expensive micros for some time, but only now is Watford Electronics able to offer the BBC Micro computer.

The HandScan plugs directly into the 1MHz bus on the BBC while a comprehensive set of utilities provided by the sophisticated ROM firmware. The scanner has a resolution of either 100 DPI or 200 DPI when accuracy is essential. Pictures as wide as 4" may be scanned in mode 0 and various types of dithering may be selected to simulate the grey levels of a scanned picture.

All necessary software has been included in the firmware to allow the scanner to read images directly into our Wapping Editor with little more than the click of the mouse. The digitised picture may then be incorporated into your magazine, newsletter, report or any other document.

Beeb HandScan & Firmware



Winner of the BBC Acorn User 1990 Award for the Best DTP/Word Processor

#### The Wapping Editor

The Wapping Editor from Watford Electronics represents a breakthrough in Desktop Publishing for the Beeb. The package includes a 64K ROM containing ALL the software needed to get into print fast; a very sophisticated graphics module professional quality typesetting software, a word processor, a comprehensive font editor for processor, a comprehensive font editor for designing your own typefaces, and a variety of printer dumps. This mouse-driven system is designed for the BBC B, the B+ and Master computers and will take full advantage of any Sideways and Shadow RAM that may be fitted. It will run under DFS, ADFS and Network filing systems and requires as a minimum just a single 40 track drive.

Included with the system is a utility disc containing several high quality fonts, various utilities and a ROM image of a Support ROM. A comprehensive 100 page manual completes the package. The Support ROM contains routines to allow an area to be rotated to any angle or distorted to any four-sided shape. Also included are facilities to draw ellipses at any angle and sectors, segments and arcs (in Master or BBC B with Acorn GXR). Another of the features of the Support ROM is a 'Turbo DFS' which gives DFS access times comparable with those of ADFS.

#### Page Layout Section

The Wapping Editor may be used to create pages of any size from an A6 to a full A3 page. If none of the eight default page types suit your purpose, the stand-alone page creation program may be used to create pages to your own requirements. By using proportionally spaced fonts and genuine microspacing it is possible to print over 150 characters across an A4 page. A unique feature of the Wapping Editor is the 'A5 x 2' page size allowing two A5 pages to be printed side by side onto a single A4 sheet onto a single A4 sheet.

The graphics module incorporates the facilities like: pencil, brush, airbrush, polygon, circle, eclipse, fill, cut & paste, etc.

Text may be typeset, either justified or unjustified, in any font anywhere on the page. Simply select which font and text document you wish to use, and pull out a rectangle on the page where you want the text to be – it's as simple as that! Multiple columns may be printed just as easily and a special 'expand' feature may be used to expand the microspacing so that the document exactly fits the space defined.

#### Word-Processor

The integral word processor is the ideal tool for producing your text documents, although text can of course be read in from any of the other popular word processors such as View, Wordwise etc.

#### The Font Editor

The font editor module will allow you to design your own typefaces or to modify the ones provided on the utility disc. This sophisticated editor has numerous functions designed to take the tedium and frustration out of producing good looking, well balanced fonts. Each character may be individully proportionally spaced and characters of any size

up to 16 x 16 pixels may be defined.
Pictures may also be 'grabbed' from a video source by using the Watford BEEB Video Digitiser.

Wapping Editor Software Pack Wapping Editor plus Mouse £79

(Wapping Editor only works with Master Compact if a Mertec Expansion box is fitted)

#### **Wapping Art Disc**

Over 250K of clip art to cut and paste into your Wapping Editor pages. Pictures include maps, transport, people, media, sport, games etc.
Two 'ratio' screens for use with hi-res and rotated A5 pages to ensure images are not distorted when printed out.

Music writing symbols in the form of pattern and brush for quick production of manuscripts are included together with staves.

There are two prepared hi-res pages layed out for printing labels, both single and double width. Ready made label designs are included but these can be easily replaced with your own designs.

A Mode 0 screen dump routine is also included. To A Mode of screen dump routine is also included. To pack such a large amount of data onto the discs the screens have been compressed and routines to compress and expand Mode 0 screens are included on both discs. Using the packing routine you can archive large numbers of screens onto a clinical disc. single disc.

#### Wapping Font Disc 1

Sixteen additional fonts, including smaller version of Oberon and Daisy and two new sizes of the standard font for the Wapping editor.

Also included are three Mode 0 screens containing giant 'headline' fonts to cut and paste to create over a greath headlines.

extra smooth headlines. Supplied complete with instructions.

£12

# Wapping Font Disc 2

This new addition to our Wapping range of DTP software provides you with additional 23 fonts for the Wapping Editor DTP pack. (80 track discs £13

#### **Archi A4 Scanner**



This most advanced Archi A4 image scanner is supplied complete with ROM based podule software. Features provided include facilities for zooming in on an image and inverting the image in X and Y directions, saving and printing of the sprite created. Interactive help is supplied using the IHELP application on the Acorn applications discs. The 216mm scanning width can cope with both desktop scanning of single sheets, photographs, diagrams, etc., with its fast ten page automatic document feeder, but it can also detach from the

decement reeder, but it can also detach from the feeder to become a convenient hand-held full page scanner for larger documents or pictures.

Scanned image control can be freely adjusted in increments of 10 dots per inch from 100 up to 400 dpi resolution with 64 levels of grey scaling. A built in shading controller and manual brightness control achieve optimum image clarity.

Unlike some scanners, which use a red light source, the Watford scanner uses a yellow/green source which vastly improves the light/dark contrast, thus eliminating the effect where any red-based colours are faded down to white and so do not show up in the scanned image. All these features and facilities combine to make

the Archi Page Scanner the fast and convenient way in which to add that extra impact, interest and clarity to documents, reports, instruction sheets, manuals, news letters, etc., from your Archimedes DTP package.

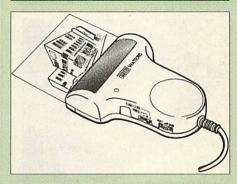
#### **New Low Prices:**

Archi A4 Scanner £349 £95 £419 Sheet Feeder for above Scanner + Sheet Feeder (Dealers Inquiry welcome)

#### Computer Concept Scanlight

| Management and Automatical State of the Stat | The same of the last of the la |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Scan-Light A4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | £375                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <ul> <li>Scan-Light A4 + Sheet Feeder</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | £475                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Scan-Light Junior mono                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | £178                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Scan-Light Junior 256                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | £215                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |

#### Archi Mk II **Hand Scanner**



Watford Electronics is now able to offer a complete hand held scanning package, possibly the most essential addition to any desk top publishing system, for only £149. The package includes the most comprehensive utility software available for the Archimedes, a high quality hand held scanner, and all necessary documentation to get you going straight away.

#### SCANNER

The scanner is capable of scanning up to an amazing 400 dots per inch (DPI)! The scanning area is 4" wide, and the height is only limited by the maximum amount of memory available. The dot resolution may be switched to 100, 200, 300 or the maximum 400 dpi. One of four operating modes may be selected offering either pure monochrome scanning, or one of three grey level modes. The grey level modes use different size dither patterns to represent up to 16 shades of grey. There is also a dial to allow the "brightness" to be adjusted over a wide range, in order to optimise the quality for any specific image. The scanner interface is a standard, single width, expansion card (podule) which plugs into the Archimedes' backplane. The socket on the rear panel connects the scanner by 1.8 metres of cable.

#### **SCANNER SOFTWARE**

Full use is made of the windowing and the multitasking facilities of RiscOS. The software is supplied in a 64Kbyte ROM located on the interface board. The scanner appears as a small icon on the desktop icon bar, and the software is retrieved from the ROM simply by clicking on that icon. As you scan a page, the image appears in the scanning window on the screen, scrolling up in real time. The other facilities included in the software are.

Cropping and scaling to any size including stretching and squashing in X and Y direction separately.

Colour tinting. X and Y flip.

Edge detection which turns solid objects into

Selective directional copying which allows features (i.e. lines or text) to be made thicker or thinner.

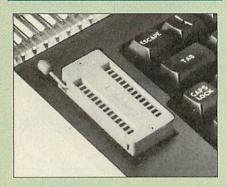
Scanned images may be saved as sprite files or transferred directly into other RiscOS applications (DTP, Draw, Paint) simply by dragging the sprite file into the application's window. Sprites may also be generated using anti-aliasing. This greatly improves picture quality and is particularly effective when scanning material with a range of grey tones, such as photographs. Images can be printed on any printer that is supported by a RiscOS printer driver, with optional settings for portrait or landscape modes, image scale and positioning. Images are printed using the full resolution of the printer and are not limited to the screen resolution.

On-screen help is provided via the RiscOS interactive help facility. Calls are also provided in the ROM for users wishing to write their own software, incorporating the use of the scanner.

AHS-4 Archi 300/400 Version £149 AHS-3 Archi A3000 Version €169

Continued  $\rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow$ 

#### Sideways ROM ZIF Socket System



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required.
   The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.
- The low profile of the socket allows unrestricted access to the Keyboard.
- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.
- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for professionals and Hobbyists alike.)
- · BBC, B and B+ compatible.

ONLY £18

# BBC B Low Profile Cartridge System

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack for the BBC B.

Complete System £11

Spare Cartridges
 £2.75

Spare Rack £1.65

# ROM Cartridges for the BBC Master

Will also accept the new larger Piggy Back ROMs like: Interword, Interbase, Quest, Conquest, etc

Twin £8; Quad £13

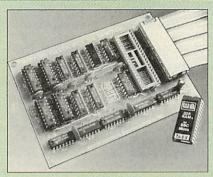
#### **User Port Splitter Unit**



Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaneously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination

Excellent Value at £22

#### 32K Shadow RAM/Printer Buffer Card Expansion Board



#### A MUST FOR WORD PROCESSING

Simply plug the ribbon cable plug into the 6502 socket and gain a massive 32K of extra RAM.

- While word processing, you don't wait for a slow printer, type in text while printing and save on expensive printer buffers.
- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28K bytes free 5 times as much as normal.
- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24k of text in memory. This product is recommended as an ideal complement by Computer Concepts.
- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20k of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28k of program space.
- Use the full 32k or the bottom 12K of the expansion RAM as a printer Buffer. (P.S. Only 12K printer buffer can be used with Wordwise & WW+, due to the way they are written).
- Unique facility to turn ROMs off and on again.

Only £54

(Price includes a comprehensive manual and the ROM)



#### Commander Joystick



Watford Electronics' new Commander Joystick for the BBC B and Master 128K has a unique dual mode of operation giving selective free floating or self centring fully variable control in both X and Y axis directions. Commander is particularly good for flight simulation and drawing programs. Features:

 Direct connection to BBC Analogue input port – no interface needed.

Fully compatible with all BBC Joystick controlled games programmes.

 Switchable springs allow selection of floating or centring operation.

 Trim adjusters for both X and Y axes for fine centre adjustment.

Convenient stick mounted fire button with additional base buttons.

Price: £15



# ARIES

#### **B-32 Shadow RAM Card**

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

as sideways HAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Cobal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus, Interword and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved \*FX call.

scientific user gets access to a massive 47k of data storage using the Acorn approved ★FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as the printer buffer) or to load tape programs into a disc system.

any operating system outler (such as the printer buffer) or to load tape programs into a disc system. The B32 simply plugs into the 6502 processor socket on you BBC micro – no flying leads to connect and no soldering. Provision of the onboard ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

Recommended by Computer Concepts for use with their Inter series of ROMs.

Price: £59

#### Aries B-12 Sideways ROM Board

The B-12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

If you do not have a B32 or B20, a small adaptor module (the Aries-B12C) is available at a nominal

Price:

Aries B-12 Aries B-12C £36 £5

#### Aries B-488 IEEE-488 Interface Unit

The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB or 'HP IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

#### £238

#### **Voltmace Joysticks**

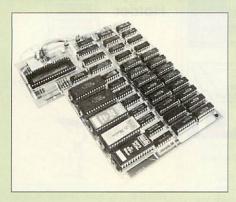
| VUILINACE DUYSTICKS                   |     |
|---------------------------------------|-----|
| Delta 3B Single Joystick              | £10 |
| Delta 3B Twin Joysticks               | £15 |
| Delta 3C Joystick for Compact         | £10 |
| Delta 14B Single Joystick             | £11 |
| Delta 14B/1 Adaptor Module            | £12 |
| Transfer Software Disc-Tape           | £7  |
| Delta-Cat A mouse eliminator Joystick |     |
| for the Archimedes                    | €24 |
|                                       |     |

#### **Delta Base B**



Analogue aircraft style yoke Joystick to run in the analogue port of the BBC B & Master 128

#### ROM/RAM Card



Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 9 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, Watford's ROM/RAM card.

- NO SOLDERING required to fit the board.
- NO User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Compatible with BBC micros (not BBC+ or
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROMSPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

| PRICES:                                        |     |
|------------------------------------------------|-----|
| <ul> <li>ROM/RAM card with 32k DRAM</li> </ul> | £45 |
| ROM/RAM card with 64k DRAM                     | £59 |
| ROM/RAM card with a massive 128k               |     |
| DRAM                                           | £99 |

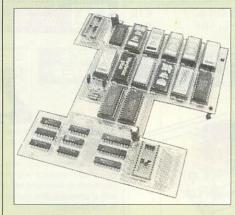
#### **OPTIONAL EXTRAS:**

| <ul> <li>16k plug-in Static RAM kit</li> </ul> | 83      |
|------------------------------------------------|---------|
| 16k DRAM for Upgrade                           | £13     |
| Battery backup                                 | £3      |
| Read and Write protect switches                | £2 each |
| Complete ROM-RAM card with all or              | otions  |
| fitted                                         | £109    |



**CREDIT CARD 24 HOUR Ansaphone Hot Lines** (0923) 50234 or 33383

#### Solderless Sideways ROM Socket Board



The key features of this no fuss, easy to install card

- . Increases your BBC Micro's ROM capacity from 4
- · No soldering required.
- Very low power consumption.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- · Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

#### Price: Only £35 Battery Backup fitted £39 Battery Backup only £3 16K Sideways RAM £8

 Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

Only: £8

#### BBC Educational Software

- Maths with a Story 1 (Disc). 4 primary level maths programs £20.00
- Maths with a Story 2 (Disc). 4 further maths programs. £20.00
- Picture Craft (Disc) 6-14 age group. Pack consists of flexible geometrical design & colouring programs. £17.00
- ECOLOGY O-Level program. £20.00 POLYMERS O-Level program. £20.00
- Classification & Periodic Table O-Level. The suite is supplied with its own database of chemical elements which can be classified

| according to your own rule.                           | £20.00 |
|-------------------------------------------------------|--------|
| ADVANCED TELETEXT SYSTEM                              | £8.65  |
| PERIOD TABLE SOFTWARE                                 | £20.00 |
| <ul> <li>Computers at Work – Primary</li> </ul>       | £17.35 |
| <ul> <li>Introducing Geography 11-17 years</li> </ul> | £17.50 |
| Electric Fields 6-14 years                            | £11.25 |
| Espana Viva – 3 Discs                                 | £19.95 |
| WHITE KNIGHT Chess game                               | £16.00 |
| A Vous La France                                      | £29.00 |
| • FUN SCHOOL 2 - Red: Under 6 yrs                     | £12.00 |
| • FUN SCHOOL 2 - Green: 6-8 yrs                       | £12.25 |
| • FUN SCHOOL 2 - Blue: 8 yrs+.                        | £12.50 |
| FUN SCHOOL 3 – Red                                    | £18.50 |
| FUN SCHOOL 3 – Green                                  | £18.50 |
|                                                       |        |

- FUN SCHOOL 3 Blue £18.50 Six French Games – Aimed at pupils in their first year of French, but also useful as revision for more advanced students 11 years+
- More French Games Another 6 games 12 years+ Au Restaurant and Accident de Route
- 12 years+ Boulogne and Oh-Les - 2 programs for

- Letters to French Penpals 11 years+
- French Programs with Henri Beret The programs in this series present vocabulary, grammar and role-play phrases in the form of animated games. 11-16
- Six German Games Aimed at pupils in their first year, but useful as revision for more advanced student of German, 12 years+
- More German Games Aimed at pupils in their 2nd year of learning German. 12 years+
- The Cloze Program Using context clues to predict is much more than a gap filling exercise.
- An Introduction to Electronics Brings together all the basic electronics required for a GCSE Physics or CDT course. 14-16 years
- · Computer Control This is a package of 3 programs simulating control of a greenhouse, a robotic arm & a chemical plant. 14-16 years £26
- The Nuclear Reactor An interactive, menu driven program for GCSE pupils. Demonstrates & explains nuclear fission & the chain reaction. 14-16 years
- PUNCMAN Learning punctuation Puncman 1 & 2 for 7 - 13 years £15 Puncman 3 & 4 for 8 - 14 years £15 Puncman 5 & 6 for 8 - 15 years £15
- Yes Chancellor A chance to take over number 11 at Downing Street. 12 years+ £18
- Letters & Pictures Introduces phonic skills to Infants 6-8 years £15
- Numbers & Pictures Early number learning is a great fun (4-6 years)
- Note Invaders Budding musicians can learn the notes on the Clef with this elegant game 3 programs (7 to Adults) £15
- Maps & landscapes No. 1 (9-14 years)
- Help Your Child learn Basic Map work No. 2 (9-14 years)
- £18 Pirate – Educational Adventure (8-14 years) £15
- Spelling Week by Week (6-14 years)

#### Archimedes Software

| í | Animated Alpha   | bet   | Glimp   |
|---|------------------|-------|---------|
|   | (3-6 yrs)        | £21   | Utility |
| ) | Arcventure       |       | Highli  |
|   | (8-12 yrs)       | £29   | (6-16   |
| ) | Bookbinder       | £43   | Jiglet  |
|   | Bumper Disc      | £14   | Jigsav  |
| , | Bumper Disc 2    | £14   | Mapve   |
| ) | Craftshop 1      | £26   | (9-13   |
| 1 | Craftshop 2      | £26   |         |
| , | Christmas Allson | rts - | Mone    |
|   |                  |       |         |

Clip Art (6-16 vrs) £16 Converta-Key £16

Data Word £16 Desktop Stories £35 DigiSim £35

Dream Time (5-7 yrs) £23 Droom £19

Farm (5-7 vrs) £19 Fleet Street Phantom (9-13 yrs) £25

 Fun School 2A Red (up to 6 years) £12 Fun School 2A

Green (6-8 years)£14 Fun School 2A Blue

(8 years +) Gate Array Teaching

System

£26

£26

£14

se Clip Art (7-16 yrs) 28 ghter yrs) £42

£27 £28 enture

yrs) £24 bugs £24 y Matters £16

 Nature Park Adventure (7-9 yrs) £27 Numerator £60

Picture Book £16 Recall (6-13 yrs) £39

• Sellardore Tales £24 Snippet £26 Space Mission

Mada (9-13 yrs) Sting of the Dump (9-13 yrs) £22

Target Maths £16 Viewpoints

(9-12 yrs) £33 Wizard's Revenge

(7-10 yrs) £17 Worst Witch £25 (7-10 yrs)

£68

#### Computer Concept's ROMS

| Communicator | £49 |
|--------------|-----|
| Disc Doctor  | £18 |
| Inter BASE   | £49 |
| Inter CHART  | £25 |
| Inter SHEET  | £37 |
| Inter WORD   | £36 |
| Mega-3 ROM   | £76 |
| Spell Master | £42 |
| Wordwise     | £24 |

## Wordwise plus

#### £40

We are giving away absolutely FREE, the superb Word-Aid ROM worth £24, with every WORDWISE PLUS package bought from us.

#### Word-Rid

#### The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses
- Text transfer options.
- Chapter marker. Epson printer codes function key
- Search and display in preview mode. Embedded command removal.
- Print Multiple copies of a document.
- Multiple file options for print and preview
- Address finder.
- Label printer.
- Mail-merger. Number/delete/renumber.
- Clear test-segment area. BBC B, B+ and Master compatible.

Only £24

(N.B. Word Aid requires a Disc interface in your Micro)

#### **Acorn ROMS**

| View 3.0 ROM                        | £45     |
|-------------------------------------|---------|
| Viewsheet (Acornsoft)               | £36     |
| Viewstore                           | £36     |
| Viewspell with 80 track             |         |
| disc                                | £25     |
| Viewplot Disc                       | £20     |
| (Please specify for Master 128 or C | ompact) |
| View-Index                          | £12     |
| Overview packs 1 & 2                | £65     |
| Hi-View                             | £38     |

#### MINI OFFICE II

DISC Version for BBC

| B & B+               | £14.00 |
|----------------------|--------|
| DISC Version for BBC |        |
| Master               | £16.00 |
| DISC Version for the |        |

Compact (When ordering please specify for which Micro & 40 or 80 track Disc)

#### View Printer Driver **Discs**

Epson FX & RX 80 £10 Juki & Brother HR £10

#### View Printer Driver ROM



View is a powerful word processor, but it seriously lacks in terms of printer driver support. With the View Printer Driver ROM, the View users will find themselves in the realms of advanced word processing.

The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, LX, JX80 range, HI80, KP810/910, PW1080, JP101, HR15, M1009, GLP, Panasonic KX-P1081/2, JUKI 6100,

Other printers are readily supported by defining a Printer Driver using the built-in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6). Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redifinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute \* command when printing.

Other features include a very powerful on-screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory-based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips.

Price: Only £29



**CREDIT CARD** 24 HOUR Ansaphone Hot Lines (0923) 50234 or 33383

#### **OFFICE** MASTER



CASHBOOK - A complete "Stand Alone" accounting software package for the cash based sole trader/partnership business. It is designed to replace your existing cashbook system and will provide you with a computerised system complete to trial balance.

FINAL ACCOUNTS - Will take data prepared by the Cashbook module and produce a complete set of accounts as following: Trial Balance with inbuilt rounding routine; Notes to the accounts; VAT Summary; Profit & Loss A/C; Balance Sheet.

MAILIST - A very versatile program. Enables you to keep records of names and addresses and then print, examine, sort and find them, all with special selection techniques

EASILEDGER - A management aid software tool designed to run alongside an existing accounting system. Essentially a Debit/Credit ledger system which can handle sales, purchase and nominal ledger routines to provide instant management

**INVOICES & STATEMENTS - Greatly** reduces the time and cost of preparing Invoices and Statements by storing essential information like customer names, addresses and account numbers. Has VAT routines and footer messages facility.

STOCK CONTROL - Allows you to enter stock received, stock out, summary of stock items and current holdings together with details of total cost, total stock to minimum level, units in stock ordering, quantity and supplier

All this for only £21 (Disc)

#### **OFFICE** MATE



- DATABASE
- BEEBCALC SPREADSHEET
- **BEEBPLOT GRAPHICS**

DATABASE - Set up a computerised card index system with powerful search facilities.

SPREADSHEET - Offers many calculation and editing features

**BEEBPLOT** - Provides visual representation from Spreadsheet data.

Only £10 (Disc)

**Acorn Speech Synthesizer** package complete, for the **BBC B Microcomputer** 

Special Offer



Whether you want to type in your latest program or the draft of a new trilogy, Watford's manuscript holders are superb for holding your paper at the ideal height and angle to allow you to read and type in ease and comfort.

Available in 2 full A4 versions, desk resting and shelf clamping. Paper is held firmly by means of a plastic retaining ruler and a clip grip. (for resting books or magazines, the desk top version is recommended).

Desk Top £8 (carr. £3) Angle poise £12 (carr. £3)

#### The Epson RX/FX/KAGA **Printer Commands Revealed Handbook**

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities - he may even have offered you a special

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out? Once again, Watford Electronics comes to your help with our new book entitled 'THE FPSON FX-KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, PW1080A or any other Epson FX80 compatible printers like Panasonic KX-P1080/1, etc., with the BBC Micro, both from Basic and Wordwise.

It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

£5.95 (No VAT)

**ALL PRICES EXCLUDE** 

#### BOOKS (No VAT on Books)

| 15 Hr Wordprocessing BBC/View           | £6.95  |
|-----------------------------------------|--------|
| 15 Hr Wordprocessing BBC/WW & WW+       | £6.95  |
| 30 Hour BASIC (BBC Micro)               | £12.95 |
| 1st Word Plus Rel. 2 Manual             | £10.00 |
| A3000 Technical Reference Manual        | £29.00 |
| Acorn DTP A Guide to                    | £17.00 |
| Advanced User Guide for BBC             | £10.95 |
| Archimedes 1st Step - Beginners Guide   | £9.95  |
| Archimedes Assembly Language            | £14.95 |
| Archimedes BBC Basic Guide              | £20    |
| Archimedes DTP Manual                   | £10.00 |
| Archimedes Operating System             | £14.95 |
| Archimedes Risc-Os Programmers          |        |
| Reference Manual                        | £79.00 |
| Arm Assembly Lang. Prog. Manual         | £15    |
| Assembly Language Quick Ref.            | £21.95 |
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broadcasting. He is currently

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given.
It is possible to gain a full understanding of the mouse from this manual. For those not interested in exactly how the mouse functions, complete example programs are also included. These may be typed directly into the micro, without the need for any understanding of the hardware or software involved, enabling the mouse to be used for custom applications.

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Example programs on Disc £4.95

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Beeb PC Basic is designed for program authors wishing to convert programs so that they will run on IBM personal computers. To convert BBC BASIC programs manually can waste days of valuable time with every occurrence of common statements such as PROC, DEFPROC, TAB, having to be changed. Beeb PC (BASIC) automates many of these changes, and will convert majority of BBC statements that are invalid for IBM BASIC into equivalent acceptable statements. In addition BBC BASIC data files can be converted to IBM BASIC format, with support provided for all BBC data formats:- INTEGER, REAL & STRING.

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#### (Now reads Archimedes Discs)

The BBC and IBM PC's are the most popular micros in the UK. The BBC is firmly established in the education sector and the IBM is the industry standard in the business world. The pools of information and applications held on these computers are immense, yet the means of passing information between them are very limited. Beeb DOS provides a practical method of transferring information between these two micros.

Beeb DOS is a collection of utilities which run on the PC's and enable it to read and write information on BBC discs. You can transfer files between your PC's 360K floppy, high density floppy or hard disc and your BBC discs. In addition Beeb DOS allows you to catalogue, format and compact BBC discs and delete, re-name, lock and unlock BBC files, all on PC's. Each Beeb DOS utility is written in IBM assembler and is run directly from PC or MS-DOS. The Beeb DOS utility can be run from floppy disc, hard disc or RAM drive.

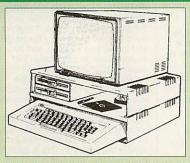
Beeb DOS is supplied on an IBM 5.25", 360K disc complete with a comprehensive operating manual. (Will only work on 360K Disk Drives & read only ADFS and Watford DDFS – not DFS).

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(Please write in for technical literature)

Continued  $\rightarrow \rightarrow \rightarrow \rightarrow \rightarrow \rightarrow$ 

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Protect your computer from the heat of your VDU. Our micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and VDU, whilst the double height version provides enough room for our stacked disc drive and other peripherals like, Eprom programmer, music unit or simply discs & stationery. The computer slides neatly in the lower section allowing easy access to remove the lid. Colour: Matching BBC Beige.

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- Two ultra fast programming algorithms or standard slow algorithm.
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Supplied wired up with mains plug ready for use.
Can be screwed to floor or wall if required.
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Metal Chip Extractor

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|   | 1256-8         | £2.00  | BBC PCB Designer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                 |
|   | 1256-10        | £1.50  | Beebmon                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | £22             |
|   | 264LP-8K       | £4.00  | Buffer & Backup                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | £20             |
|   | 502A CPU       | £5.00  | Communicator                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | £49             |
|   | 5C02 3M        | £9.75  | Dump Out 3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | £25             |
|   | 5C12           | 29.00  | EPSON NLQ ROM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | £25             |
|   | 512A           | £10.00 | Graphics Extension                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |                 |
|   | 522            | £4.00  | GXR-B                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | £21             |
|   | 522A           | £5.00  | GXR-B+                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | £22             |
|   | 2256ALS-15     | £10.00 | ICON Master                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | £28             |
|   | 2256P-12       | £8.50  | Logotron LOGO                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | £43             |
|   | 818            | £4.00  | MASTER OS ROM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | £38             |
|   | 845SP          | €6.00  | Master ULA (47)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | £15             |
|   | 8B50           | £2.95  | Master ULA (60)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | £10             |
|   | 8B54           | £7.50  | Micro Prolog                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | £25             |
|   | 438            | 50p    | Microtext Disc                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | £46             |
|   | 4LS00          | 50p    | Microtext Rom                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | £199            |
|   | '4LS04         | 50p    | NLQ DESIGNER                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | £25             |
|   | 4LS10          | 50p    | Numerator - Archi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | €69             |
|   | 4LS123         | £1.00  | Numerator - BBC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | £39             |
|   | 4LS163         | £1.00  | Pendown ROM                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | £32             |
|   | 4LS244         | £1.00  | Rom Manager                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | £20             |
|   | 4LS245         | £1.00  | ROMIT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | £29             |
|   | '4ALS245       | £2.75  | SERIAL ULA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | £13             |
|   | 4LS373         | £1.00  | TED                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | £35             |
|   | 4LS393         | £1.00  | Termulator B, B+                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | £28             |
|   | 5453           | 61 00  | Terminator B, b+                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 220             |

£1.00

£3.00 £2.00

Termulator Master

Video ULA ULTRACALC II

1Mb OS ROM

£32

£14

£26



Watford's NEW Innovative IDE interface card brings the latest advances in PC hard disc technology to within reach of the Archimedes user. Because of the integration of the controller and drive electronics onto one compact board, Watford Electronics have been able to include extra features into the drive, such as Caching, where tracks are buffered in fast memory, reducing access times and increasing throughput. All these benefits make IDE drives far more attractive than conventional STEOS drives or SCSI.

conventional ST506 drives or SCSI.

Watford's advanced interface allows IDE drives to work on any Archimedes machine, speeds in excess of SCSI devices can be obtained at a

fraction of the cost of a SCSI drive.

Up to four drives are supported by the IDE filling system IDEFS, up to two drives can be attached to system incers, up to two drives can be attached to each expansion card, up to four cards can be installed in a machine. An optional 20Mb or 40Mb hard disc can be supplied on the podule expansion card itself, with its fast transfer rate and power saving modes the drive is ideal for storing commonly used software such as the !Fonts application

A powerful security feature has been provided with the two unique commands \*IDELock and \*IDEUnlock, ideal for educational establishments where hacking or tempering may be prevalent that may lead to loss of data. Once locked, the configuration can not be changed until a secret password is used. The IIDEForm Write Protect option is particularly useful in conjunction with \*IDELock as it will prevent any unauthorised deletion of data. deletion of data.

By an innovative use of on-board memory, the card will remember its configuration, even if moved to another slot or even a different machine, this also includes the unique security features.

#### Hardware

- Single width EuroCard
- Supports proposed ANSI ATA (IDE) specification Fast 16 bit MEMC interface interrupt driven to support background disc operations
  5 Mbytes per second peak transfer rate
- Built in Non Volatile RAM to hold configuration
- LED activity indicator
- 37 way D type socket for external drives Optional on-card 20Mb or 40Mb hard disc
- Up to two drives (master and slave) per card
- Multiple cards per machine (up to four)

#### Software

- Conforms fully to the Acorn IDE Specification
- All software supplied in ROM Filing system 'IDEFS'
- Desktop filer with drive ready detection and disc name under icon
- IIDEForm, WIMP based configuration and formatting software
- Drives can be individually write protected
- Up to four drives over multiple cards Power saving standby modes supported with configurable timeout
- Drives can be used without translation in native mode for minimum overhead IIDEFSDisk, creates PC emulator hard discs

#### \*Commands

- \*IDELock
- \*IDEUnlock

! DEFS

Selects the IDE filing system 'IDEFS'. \*IDEDrives

Displays the configuration and native characteristics of installed drives.

Configure IDEFSDirCache

\*Configure IDEFSBuffers

Configure IDEFSDrive

Typical transfer speeds

Prairie Tek 20Mb 650K bytes per second 43Mb Seagate 800K bytes per second

#### **Prices**

| Part No. | Capacity | Access Speed | Price       |
|----------|----------|--------------|-------------|
| ADA 0520 | 44Mb     | 28mS         | £249        |
| ADA 0530 | 100Mb    | 16mS         | £395        |
| ADA 0570 | 200Mb    | 15mS         | £535        |
| ADA 0580 | 330Mb    | 15mS         | <b>£POA</b> |

All the above 3.5" hard drives are supplied complete with Controller Card, cable & Software on ROM. (Internal fitting). For use with A300/A400/A500 series machines.

For A3000 users an additional external Case and PSU will be required.

AAA 0300 External Case & PSU for A3000

#### Internal Hard Disc Drives for A3000

| ADA 0700             | 21Mb | 23mS |           | ★£275       |
|----------------------|------|------|-----------|-------------|
| ADA 0720             | 44Mb | 28mS | Available | <b>ETBA</b> |
| ADA 0720<br>ADA 0730 | 89Mb | 18mS | Soon      | ETBA        |

Supplied complete with Podule, Fan, Cable & Fitting instructions.

\* Tentative Launch Price

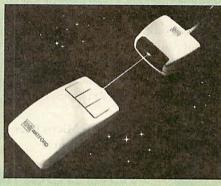
#### Archi IDE Hard Cards



Watford's NEW low cost, high performance revolutionary IDE Hard Cards for the A300 and A400 series Archimedes are unbelievably easy to install - you simply slot one into any vacant podule backplane slot in the rear of your computer. These stunningly engineered, light weight but fast, 2.5" miniature hard drives are mounted onto the professionally designed cards, and are supplied with the fully Acorn-conformant IDE Filing System ready installed and ready to run. A novel feature of the hard cards is that they can be easily removed and transported to another Archimedes, for example to make a hard disc backup, or to transfer saved files from work to home etc. Security of files on the hard disc is ensured by our unique security password lock, which allows files to be read only, but not overwritten or deleted ideal for use in school applications where the integrity of your master software needs to be retained.

| ADA 0650     | 21Mb      | 23mS       | £345   |
|--------------|-----------|------------|--------|
| ADA 0660     | 44Mb      | 28mS       | £495   |
| ADA 0670     | 89Mb      | 18mS       | ETBA   |
| (Can be used | as a Remo | vable Hard | Drive) |

#### NEW 4 **Archimedes Cordless Mouse**



Ever found that using a mouse on a busy desktop has its problems? The cable is always being caught up in papers, tangled round equipment and other cables etc, and what about that cup of coffee spilled over your work!

Watford Electronics' new Cordless Mouse solves these problems by removing the cause for concern replacing the cable with a simple infra red link. It still provides all the speed and easy control of a conventional mouse, but with complete freedom. In use, there are no operating differences between the standard mouse and the new cordless mouse so all mouse functions and mouse driven RISC software will be fully compatible. Pinpoint accuracy is ensured by a unique Accelerator button, which, when pressed, moves the pointer by just a tiny amount for a large slow movement of the mouse, but by a large amount for a quick wizz of the

#### **Features**

- Infra Red Signal Transmission
- High Resolution 200 DPI
- High Tracking Speed of 600mm/s up
- Anti-static Silicon Rubber Coated Ball
- Low Friction Teflon Footpads Power - by two AAA size batteries (not included)
- Automatic Standby Mode after 5 seconds inactive
- Auto Power Shut-Down after 20 seconds inactive

Price £59

#### Watford Electronics are:

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- ARIES PC Dealer/Distributor
- Canon Authorised Printer Dealer
- Cambridge Computer Dealer
- Citizen Printers Special Dealer
- Computer Concept Premier Dealer **EIZO Monitor Dealer**
- Microvitec Appointed Dealer
- **NEC Appointed Dealer**
- Panasonic Premier Dealer
- Roland Plotter Official Dealer
- Star Printer Premier Dealer
- Taxan Appointed Monitor Dealer
- 3M Media Premier Distributor



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Creator



ALPS is the adventure creation system for the Archimedes. ALPS is multi-tasking with a built-in text editor and a sophisticated sentence analyser that can handle complex player commands. You can import graphics and redesign the character set. With its unique mouse-driven user interface and ramsave and ramload features, ALPS has been used to produce several commercial and public domain adventures. Includes 40 page Introductory and 66 page Reference Guides.

"Painstakingly put together" - Micro User "Powerful and easy to use" - Archive

Creator is a complete easy-to-use arcade game designer that runs in the Desktop on the Archimedes and A3000 to bring professional games techniques to everyone. On two discs, including the designer, run-time system, sampled sounds, tunes, sprite library and demonstration games and comes with a 50 page User Guide, Many, many features: • Animated sprites • Screen designer • Flight paths • Attack waves • Parallax scrolling • Sound effects • Music • Scrolling stars • No royalties

Creator Support Disc

A disc with several useful applications for use with Creator.

Compact your sprite files and title screen, make outline fonts

into Creator 'alphabet' files, convert sprites directly into

Creator objects, run your games in Mode 9 for speed and

"Impressive ease of use" - BBC Acorn User "An excellent piece of software" - Micro User

memory savings, build a background from

individual 'building block' scenery sprites.



# **UltraSonic**



UltraSonic is the only fully RISC OS compliant, multi-tasking sound effect and music system. Simple point-and-click or MIDI note entry. Music may be used in Creator games and demos or simply for your own enjoyment, Includes Music Editor, Tracker Converter, Sample Converter, PD playback module, seven demo tunes and over 150 sound samples on two discs.

"A convenient way to create tunes" Micro User  $\pm 30.00$ 

Also available: ALPS Support Disc - provides text and graphics compression for ALPS: crams more text into memory and allows more pictures on disc. £19.95.





© 0762 342510

Creator Sprite Library #1: Commandos, Terrorists, Dwarf, Archer, Wizard, Tanks, Medaeval & SciFi Scenery, Planets, Horses and more. Includes animation test program. £5.00 Creator Sound FX #1: Digitised gunshots, explosions, scream, laugh, jet aircraft, sonar and many more. £5.00

'Music Discs 1-3': At least 9 tunes on each disc, '3 Games + 3 Demos', 'Graphics & Sound Utilities': each disc only £1.50.

UK Postage and packing FREE on all orders. EEC please add £2.50, Others: £3.50. Alpine Software, Dept BAU6, PO Box 25, Portadown, CRAIGAVON, BT63 5UT





RISC OS Euclid is the best multi-tasking 3D graphics and animation system for the Archimedes. It is effectively a 3D version of Draw.

Mogul makes full use of Euclid's unique hierarchical data structure to generate animations of 3D objects with articulated motion and simultaneous camera motion.

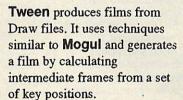
ArcLight is a multi-tasking ray-tracer which will generate a realistic Euclid picture, or a complete Mogul film, while you are free to get on with other work.











Splice allows you to edit films produced by Mogul or Tween. You can even produce hand-drawn cartoons by converting sprites from any source.

Such is the enthusiasm for Euclid there is a user group called Elements, now in its second year, which provides a quarterly disk containing hints, tips, animations and user pictures.

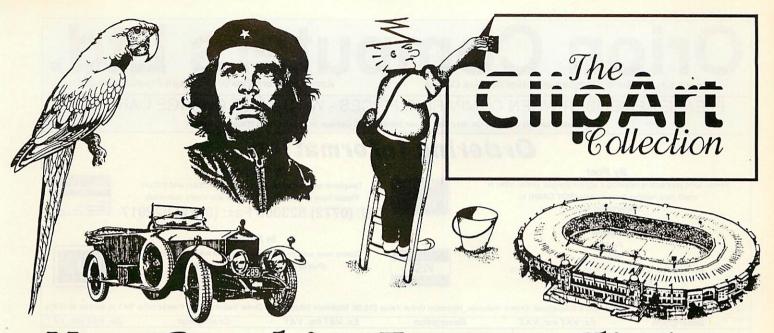
Euclid £70 Mogul £20 Splice £30 Tween £30 (inc.VAT)

ArcLight £50

Ace Computing 27 Victoria Road, Cambridge, **CB4 3BW.** 

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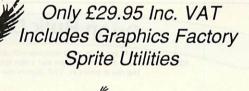
# Volume Five: Characters

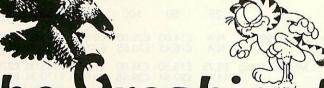
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# Acorn Computers

Acorn A5000 & Acorn Badged Multisync RISC OS 3.00, Arm 3 25Mhz CPU, 40Mb IDE Drive, 2Mb Ram, 1.6Mb Floppy,

#### Mk II Learning Curve

1st Word PLus, New PC Emulator, Genesis Plus, 2hr Introductory cassette, LC Mag, & Pacmania, also just over the christmas period Lemmings & TDK blank discs.

| BBC Master 128K                       | 399.00      | 468.83  |
|---------------------------------------|-------------|---------|
| BBC A3000                             | 599.00      | 703.83  |
| BBC A3000 Learning Curve Mk II        | 637.45      | 749.00  |
| BBC A3000 Learning Curve Mk II Colour | 850.21      | 999.00  |
| (Includes Acom AKF17 & Stand)         |             |         |
| BBC A3000 Special Access              | 679.00      | 797.83  |
| Archimedes 410/1                      | 899.00      | 1056.33 |
| Archimedes 420/1 Learning Curve       | 1105.53     | 1299.00 |
| Acom A5000                            | 1499.00     | 1761.33 |
| Acom A5000 Learning Curve Mk II       | 1531.06     | 1799.00 |
| A5000 price includes an Acom Mu       | tisync Moni | tor     |
| Archimedes 540                        | 2495.00     | 2931.63 |

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£35.00 discount off other goods bought with A3000 computer, plus either 2Mb Upgrade F.O.C., 4Mb for £100.00

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| A5000 Learning Curve & Acorn Multisync | 179.00      | 135.00  |
| Finance Prices Shown above IM          | TI LIDE VAT |         |

# Cables

|                                              |         | _      |
|----------------------------------------------|---------|--------|
| Arc to Monitor + Audio 1.2m (Not 8833 II)    | £8.65   | £10.16 |
| Arc to 8833 Mk II Monitor Cable + Audio 1.5r | n £8.65 | £10.16 |
| Arc Keyboard Extension Cable 2m              | £7.75   | £9.11  |
| Arc Mouse Extension Cable 2m                 | £7.75   | £9.11  |
| Arc Keyboard Replacement Cable               | £6.95   | £8.17  |
| Arc Mouse Replace. Cable (State Type)        | £6.95   | £8.17  |
| 4 way protector socket on trailing lead      | £17.95  | £21.09 |

#### A400/1 Accessories Items marked with an

can be used on A300/540. Mb RAM Upgrade £39.00 £45.8 2Mb RAM Upgrade £75.00 £88.1 £123.3 3Mb RAM Upgrade £105.00

| Above memory intentio            | E10.00   |         |
|----------------------------------|----------|---------|
| Acorn Ethernet Card              | £219.00° | £257.33 |
| Arm 3 Upgrade (Adelph One)       | £349.00  | £410.08 |
| 4Mb to 8Mb Upgrade               | £649.00  | £762.57 |
| Com. Con. Scan-Light Mk II A4    | £369.00* | £433.58 |
| Com. Con. Sheet Feeder for above | £149.00* | £175.08 |
| Com. Con. Scan-Light + Feeder    | £454.00° | £533.45 |
| Com. Con. Scan-Light Junior      | £165.00* | £193.88 |
| Com. Con. Scan-Light 256         | £199.00* | £233.83 |
| Com. Con. Sheet Feeder for A4    | £94.00*  | £110.45 |
| VIDC Enhancer                    | £27.00   | £31.73  |
| Econet Module                    | £48.00*  | £56.40  |
| Beebug Disc Buffer               | £34.00   | £39.95  |
| Orion TV Modulator + Audio       | £65.00*  | £76.38  |

| Archimedes 540             | Only    |         |
|----------------------------|---------|---------|
| Mb RAM Upgrade (Upto 16Mb) | £379.00 | £445.33 |
| IDC Enhancer (540 only)    | £10.00  | £11.75  |
| A AF000 O                  |         |         |

Acorn A5000 Only 2Mb Ram Upgrade

# Monitors

| Acorn Colour Monitor (AKF17)          | £200.00 | £235.00 |
|---------------------------------------|---------|---------|
| Philips CM8833 II Colour Monitor      | £209.00 | £245.58 |
| Microvitec CUB3000                    | £200.00 | £235.00 |
| Taxan MultiVision 775 (0.28 d.p.)     | £389.00 | £457.08 |
| Taxan MultiVision 795A (0.26 d.p.)    | £439.00 | £515.83 |
| (FST Black Trinitron Anti-Glare Tube) |         |         |

# A3000 Accessories

| Orion 1 Mb RAM Upgrade                                                         | £55.00          | £64.63  |
|--------------------------------------------------------------------------------|-----------------|---------|
| (Expandable to 4Mb using                                                       | only 8 chips)   |         |
| Orion 3 Mb RAM Upgrade                                                         | £156.00         | £183.30 |
| A3000 Podule Expansion System                                                  | £54.95          | £64.57  |
| 2 slot external podule expansion case<br>compatible 400 series cards simultane |                 | of two  |
| For example, the CC Laser Direct Car<br>Interface.                             | d with an Orion | IDE     |
| Serial Upgrade                                                                 | £18.00          | £21.15  |
| PRES Monitor Stand                                                             | £24.95          | £29.32  |
| CC Scanlight Junior A3000                                                      | £165.00         | £193.88 |
| CC Scanlight A4 Mk II A3000                                                    | £369.00         | £433.58 |
| CC Sheetfeeder for A4 Scanner                                                  | £149.00         | £175.08 |
| CC Scanlight A4 + Sheetfeeder                                                  | £454.00         | £533.45 |
|                                                                                |                 | 2000.40 |

# £125.00 £146.83

| Programmers Heterence Manuals | £//.00 | £//.00 |
|-------------------------------|--------|--------|
| BASIC V Guide                 | £19.45 | £19.45 |
| A3000 Technical Guide         | £28.95 | £28.95 |
| A5000 Technical Guide         | £65.00 | £65.00 |
| A540 Technical Guide          | £65.00 | £65.00 |
| Basic V: A Dabhand Guide      | £9.95  | £9.95  |
| Archimedes First Steps        | £9.95  | £9.95  |
| Archimedes Assembly Language  | £14.95 | £14.95 |
| Extra Manuals                 |        |        |

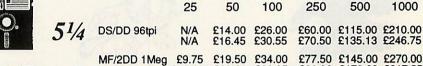
Books

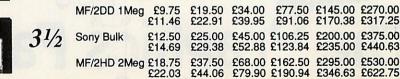
Orion TV Modulator + Audio

| Acom D.T.P.   |                           | £10.00 | £10.00 |
|---------------|---------------------------|--------|--------|
| 1st Word Plus | Release 2                 | £10.00 | £10.00 |
| ANSI C Releas | se 3                      | £20.00 | £20.00 |
| ANSI C Releas | se 4 (Desktop C)          | £25.00 | £25.00 |
| Acom Assemb   | ler Rel. 2 (Desktop Ass.) | £25.00 | £25.00 |
|               |                           |        |        |

#### Orion Bulk Diskettes

All our disks come complete with labels etc. and are 100% certified error free. In the event that a disk fails it will be replaced immediately. Top row of prices ex. VAT. Bottom row of prices inc. VAT.





#### **Printers**

#### PLEASE NOTE

ALL our printers are UK Models and NOT grey imports.
Please take this into account when deciding where to purchase your printer.

| C.C. Qume Laser Direct                 | £859.00  | £1009.33 |
|----------------------------------------|----------|----------|
| C.C. 600 DPI Expansion Card            | £319.00  | £374.83  |
| Canon LBP4 Laser for above             | £659.00  | £774.33  |
| C.C. 600 DPI LBP8 Laser Direct         | £1319.00 | £1549.83 |
| Canon Bubblejet BJ10e (White or Black) | £219.00  | £257.32  |
| Citizen 120D+ (Parallel)               | £115.00  | £135.13  |
| Citizen 224                            | £199.00  | £233.83  |
| Citizen Swift 9                        | £162.00  | £190.35  |
| Citizen Swift 24e                      | £235.00  | £276.13  |
| Citizen Swift 24xe                     | £329.00  | £386.58  |
| H.P. Deskjet 500                       | £339.00  | £398.32  |
| Star LC20                              | £130.00  | £152.75  |
| Star LC200 Colour                      | £175.00  | £205.63  |
| Star LC24-200 Mono                     | £205.00  | £240.88  |
| Star LC24-200 Colour                   | £249.00  | £292.58  |
|                                        |          |          |

# Ribbons (Branded)

| Amstrad DMP2000/3160               | £5.50  | £6.46   |
|------------------------------------|--------|---------|
| Citizen 120D                       | £3.80  | €4.47   |
| Citizen Swift 24 Black             | £4.00  | £4.70   |
| Citizen Swift 24 Colour            | £15.00 | £17.63  |
| Epson LX80/86                      | £4.00  | £4.70   |
| Epson FX80,MX80,LX800              | £5.00  | £5.88   |
| Epson LQ400,550 Fabric             | £6.00  | £7.05   |
| Epson MX100,FX1000,FX1050          | £6.75  | £7.93   |
| Epson EX800/1000 Black             | £7.90  | £9.29   |
| Panasonic KXP145.KXP115            | £7.95  | £9.34   |
| Panasonic KXP140                   | £10.00 | £11.75  |
| Star LC10                          | £4.25  | £4.99   |
| Star LC10 4 Colour                 | £6.50  | £7.64   |
| Star LC200 Black                   | £6.00  | £7.05   |
| Star LC200 Colour                  | £12.00 | £14.10  |
| Star LC24/10 / LC24 200 Black      | £8.00  | £9.40   |
| Star LC24 200 Colour               | £13.50 | £15.86  |
| Cartridges                         |        |         |
| Canon LBP4 Toner Cartridge         | £55.00 | £64.62  |
| Canon LBP8 Toner Cartridge         | £62.00 | £72.85  |
| Canon BJ130 Bubblejet (BJI481)     | £10.00 | £11.75  |
| Canon BJ10e Bubblejet (BC01)       | £16.29 | £19.14  |
| Canon BJ300/330 Bubblejet (BJI642) | £12.00 | £14.10  |
| Colourjet 132/Canon PJ1080 Black   | £9.25  | £10.86  |
| Colourjet 132/Canon PJ1080 Colour  | £14.75 | £17.33  |
| HP Paintjet Black                  | £21.00 | £24.68  |
| HP Paintjet Colour                 | £26.00 | £30.55  |
| HP Deskjet + (Permanent Ink)       | £13.20 | £15.51  |
| Qume Crystal Print Toner Set       | £67.00 | £78.73  |
| Qume Crystal Print Drum Set        | £89.00 | £104.58 |

# Ribbons (Comp.)

All of our compatible ribbons are high quality British brand.

|    | We do not sell "White Box" comp     | patible ribbons. |       |
|----|-------------------------------------|------------------|-------|
| В  | rother M1009,M1109                  | £4.00            | £4.70 |
| В  | rother HR10,15,20,25,35 Fabric      | £4.30            | £5.05 |
| В  | rother HR10,15,20,25,35 Multistrike | £4.30            | £5.05 |
| C  | anon PW1080A                        | £4.55            | £5.23 |
| c  | itizen 120D/Swift 24                | £3.50            | €4.11 |
| E  | pson LX80,86                        | £2.95            | £3.47 |
| E  | pson FX80,MX80,LX800,LX850          | £3.60            | £4.23 |
| E  | pson LQ500,LQ800,LQ850              | £4.15            | £4.88 |
| E  | pson LQ1000,LQ1050,FX1000           | £5.30            | £6.23 |
| E  | pson LQ2500,LQ2550                  | £6.55            | £7.70 |
| E  | oson EX800                          | £6.55            | £7.70 |
| Pa | anasonic KXP1081,1180,1090,1124     | £4.20            | £4.94 |
| SI | ar LC10                             | £3.45            | £4.05 |
| St | ar LC10 4 Colour                    | £5.50            | £6.46 |
| St | ar LC24/10                          | £4.80            | £5.64 |
|    |                                     |                  |       |

Discounts available on all ribbons for volumes of 3 plus

Please call for prices on any ribbons not listed here. We can supply almost any ribbon required and, dependent on quantity, any colour.

Please Note - Quoting the CARMA Group Code speeds up our search for a ribbon compatible with your printer.

# Archimedes/A3000 Software

| DTP                                                     |          |                    |                    |
|---------------------------------------------------------|----------|--------------------|--------------------|
| Impression II (CC)                                      |          | 04.00.00           | 0454 57            |
| Impression Junior (CC)                                  |          | £129.00<br>£74.00  | £151.57<br>£86.95  |
| Impression Business Supple                              | ment     | £42.00             | £49.35             |
| EasiWriter (Icon Technology                             | )        | £134.00            | £157.45            |
| Desktop Folio (ESM)                                     |          | £79.00             | £92.83             |
| Spreadsheets                                            |          |                    |                    |
| Sigmasheet (Minerva)                                    |          | £39.95             | £46.94             |
| Schema (Clares)                                         |          | £99.00             | £116.33            |
| <b>WordProcessor</b>                                    | 8        |                    |                    |
| 1st Word Plus Release 2 (Ad                             | orn)     | £69.95             | £82.19             |
| EaslWord (Minerva)                                      |          | £16.00             | £18.80             |
| Protext 5.0 (Amor)                                      |          | £119.00            | £139.83            |
| Integrated Pac                                          | kages    |                    |                    |
| Pipedream 3 (Colton)                                    |          | £119.00            | £139.83            |
| Desk Top Office (Minerva)                               |          | £69.95             | £82.19             |
| Databases                                               |          |                    |                    |
| Datavision (Silicon Vision)                             |          | £127.45            | £149.75            |
| Flexifile (Minerva)                                     |          | £84.45             | £99.22             |
| Multistore (Minerva)                                    |          | £154.95            | £182.07            |
| Genesis II (Oak Solutions)                              |          | £119.00            | £139.83            |
| Knowledge Organiser (Clares                             | 100      | £42.00             | £49.35             |
| Accounting Sof                                          |          |                    |                    |
| Financial Accountant (S. Visio                          | on)      | £233.75            | £274.66            |
| Home Accounts (Minerva)                                 |          | £34.95             | £41.07             |
| Business Accounts (Minerva)<br>Office Tools (S. Vision) |          | £299.00<br>£318.75 | £351.33<br>£374.53 |
|                                                         |          | £310.75            | 23/4.33            |
| Languages                                               |          | To Not your Plans  |                    |
| ANSI C Release 3 (Acom)                                 | MEM      | £125.00            | £146.88            |
| Desktop C (Acorn) Desktop Assembler (/Acorn)            | NEW      | £189.00<br>£129.00 | £222.08<br>£151.58 |
| RiscForth (S. Vision)                                   | ···      | £127.45            | £149.75            |
| Music                                                   |          |                    | 2                  |
| Armadeus (Clares)                                       |          | £61.00             | £71.68             |
| Rhapsody II (Clares)                                    | NEW      | £44.95             | £71.88             |
| Tracker (Serial Port)                                   |          | £38.95             | £45.77             |
| Utilities                                               |          |                    |                    |
| Arc DFS (Dabs Press)                                    |          | £22.95             | £26.97             |
| Dot Matrix Colour Printer Driv                          | er (Ace) | £12.72             | £14.95             |
| Compression (CC)                                        | NEW      | £42.00             | £49.35             |
| Education                                               |          |                    |                    |
| Fun Sch. 3 Under 5's (Databa                            | sa) NEW  | £18.00             | £21.15             |
| Fun Sch. 3 5-7 (Database)                               | NEW      | £18.00             | £21.15             |
| Fun Sch. 3 Over 7's                                     | NEW      | £18.00             | £21.15             |
| Graphics Manip                                          | ulation  |                    |                    |
| Poster + Fonts (4Mation)                                |          | £79.00             | £92.83             |
| Render Bender II (Clares)                               | NEW      | £99.00             | £116.32            |
| Graphbox Professional (Miner                            | va) NEW  | £104.95            | £123.32            |
| Graphics - Art                                          |          |                    |                    |
| Pro Artisan (Clares)                                    |          | £79.00             | £92.83             |
| Atelier (Minerva)                                       |          | £69.95             | £82.19             |
| Clipart Coll. Vol. 1 (General)                          |          | £19.95             | £23.44             |
| Clipart Coll. Vol. 2 (General)                          | NEW      | £25.49             | £29.95             |
| Clipart Coll. Vol. 3 (Animals)                          | NEW      | £25.49             | £29.95             |
| Clipart Coll. Vol. 4 (Sport)                            | NEW      | £25.49             | £29.95             |
| Clipart Coll. Vol. 5 (Characters                        | ) NEW    | £25.49             | £29.95             |
| Misc                                                    |          |                    | 340.               |

We would like wish all our customer's new and old a very merry christmas and prosperous new year.

NEW

£94.00 £110.45

£22.95

PC-Emulator V1.7 (Acom)

Investigator II (Serial Port)

#### Campe

|   | Games                                                 |        |                  |                  |
|---|-------------------------------------------------------|--------|------------------|------------------|
| 7 | Adv. of Sylvia Lain (4th Dim.)                        | NEW    | £18.00           | £21.1            |
| 5 | Air Supremacy (Superior)                              | NEW    | £18.00           | £21.1            |
| 5 | ARCticulate (4th Dim.)                                |        | £18.00           | £21.1            |
| 5 | ARCtist (4th Dim.)                                    |        | £18.00           | £21.1            |
| 3 | Ballarena (Eterna)                                    |        | £14.45           | £16.9            |
|   | Blowpipe (Eclipse)                                    |        | £14.45           | £16.9            |
| 4 | Blaston (Eterna)                                      |        | £14.45           | £16.9            |
| 3 | Boogle Buggy (4th Dim.)                               |        | £18.00           | £21.15           |
|   | Break 147/Superpool (4th Dim)                         |        | £18.00           | £21.1            |
|   | Bubblefair (Eterna)                                   |        | £14.45           | £16.9            |
| 9 | Cartoon Line (Eterna)                                 | NEW    | £18.00           | £21.15           |
| 0 | Catalysm (4th Dim.)                                   | NEW    | £18.00           | £21.15           |
| 3 | Chess 3D (Micropower)                                 | NEW    | £14.45           | £16.98           |
|   | Chequered Flag (CIS) Chocks Away Version II (4th Dim. | NEW    | £18.00<br>£18.00 | £21.15           |
| 3 | Chocks Away Extra Missions                            | ,      |                  | £21.15           |
| 9 | Chocks Away Compendium                                |        | £14.45<br>£28.00 | £16.98           |
|   | Chuck Rock (Krisalis)                                 | NEW    | £19.50           | £22.91           |
| _ | Drop Ship (4th Dim.)                                  |        | £14.45           | £16.98           |
| 2 | E - Type (4th Dim.)                                   |        | £14.45           | £16.98           |
| 7 | E - Type Compendium (4th Dim.)                        | NEW    | £18.00           | £21.15           |
| 3 | Elite (Hybrid)                                        | NEW    | £32.00           | £37.60           |
| 5 | Enter the Realm (4th Dim.)                            | NEW    | £18.00           | £21.15           |
| • | Fine Racer (Etema)                                    |        | £14.45           | £16.98           |
|   | Grievous Bodily 'ARM (4th Dim.)                       | NEW    | £18.00           | £21.15           |
| 5 | Holed Out Compendium (4th Dim.                        |        | £18.00           | £21.15           |
| 7 | Hostages (Superior)                                   |        | £14.45           | £16.98           |
| 3 | Iron Lord (Cygnus)                                    |        | £14.45           | £16.98           |
| 3 | Inertia (4th Dim.)                                    |        | £14.45           | £16.98           |
|   | Interdicter II (4th Dim.)                             |        | £24.00           | £28.20           |
| 3 | James Pond (Krisalis)                                 | NEW    | £19.50           | £22.91           |
| 3 | Kerbang (Eterna)                                      | NEW    | £11.45           | £13.45           |
| 3 | Kaptain Konflikt (Calderglen)                         |        | £12.00           | £14.10           |
| 5 | Leg. of the Lost Temple (Etema)                       | NEW    | £18.00           | £21.15           |
|   | Lemmings (Krisalis)                                   | NEW    | £19.50           | £22.91           |
|   | Mad Professor Mariarti (Krisalis)                     |        | £14.45           | £16.98           |
| 3 | Magnetic Scrolls Colin (Virgin)                       | NEW    | £25.00           | £29.38           |
| 2 | Manchester Utd. (Krisalis)                            | NEW    | £19.50           | £22.91           |
|   | Manchester Utd. Europe (Krisalis)                     | NEW    | £19.50           | £22.91           |
|   | Master Break (Superior)                               |        | £14.45           | £16.98           |
|   | Microdrive 3D World Series (CIS)                      | NEW    | £10.45           | £12.28           |
| 5 | Mig-29 Super Fulcrum (Domark)                         | NEW    | £30.00           | £35.25           |
| , | Minipack 4 (C.I.S.)                                   |        | £19.95           | €23.44           |
| 3 | Minipack 5 (C.I.S.)<br>Nevryon (4th Dim.)             |        | £23.95           | £28.14           |
|   | Pandora's Box (4th Dim.)                              | NEW    | £14.45<br>£18.00 | £16.98<br>£21.15 |
| 1 | Poizone (Etema)                                       | NEW    | £14.45           | £16.98           |
| 1 | Powerband V. II (4th Dim.)                            | 145.44 | £18.00           | £21.15           |
|   | Rockfall (Eterna)                                     | NEW    | £14.45           | £16.98           |
|   | The Real McCoy 1 or 2 (4th Dim.)                      |        | £21.50           | £25.26           |
| 4 | Tower of Babel (Cygnus)                               | NEW    | £18.00           | £21.15           |
|   | Twin World (Cygnus)                                   |        | £14.45           | £16.98           |
|   | Saloon Cars (4th Dim.)                                |        | £18.00           | £21.15           |
| 1 | Speech (Superior)                                     |        | £14.45           | £16.98           |
| 1 | Wimp Game (4th Dim.)                                  |        | £14.45           | £16.98           |
| 1 | WorldScape (Eclipse)                                  |        | £14.45           | £16.98           |
|   | World Champ. Boxing Man. (Krisal                      | is)    | £19.50           | £22.91           |
|   | World Champ. Squash (Krisalis)                        | L      | £19.50           | £22.91           |
|   | Wonderland (Virgin)                                   |        | €24.50           | £28.79           |
|   | X-Fire (4th Dim.)                                     | NEW    | £18.00           | £21.15           |
|   | Zelanites (MicroPower)                                |        | £18.00           | £21.15           |
|   |                                                       |        |                  |                  |
|   |                                                       |        |                  |                  |

#### Please ring for current prices on software NOT listed here



# High performance Hard Disc Sub-Systems for Archimedes & A3000 Computers

Fast A.T. Bus Interface.

Easy Installiation.

Fit 2 drives internally (300/400/500 series)

A3000 compatible.

Tested with: Seagate, Quantum, Maxtor, Conner & Others.

Interface has worked with EVERY drive we have tried!!

Interface, Manual, and Cables £119.00 ex. V.A.T.

Special Offer!! - I.D.E. Interface for £50.00 when purchased with one of our hard drives.

| Standard Drives  |              | Track Cache Drives |         |  |
|------------------|--------------|--------------------|---------|--|
| 20Mb             | £145.00      | 52Mb               | £249.00 |  |
| 239Mb            | £459.00      | 105Mb              | £339.00 |  |
|                  |              | 125Mb              | £369.00 |  |
| All drives for 4 | 00 series    | 180Mb              | T.B.A.  |  |
| supplied with a  | all fixings. | 210Mb              | £589.00 |  |

For A3000 Please add £65.00 for case & power. Prices shown are excluding V.A.T.

# A3000 Twin Podule Expansion System

Connect two 400 Series cards to your A3000 at the same time. Both podules are available for use with no switching or extra software needed.

Supplied in colour keyed case with full fitting instructions. No soldering required.

£54.95 ex. V.A.T.

# MegaBytes!

A400/A3000/A5000 Memory Upgrades

| A400/1                   |         |
|--------------------------|---------|
| 1Mb                      | £39.00  |
| 2Mb                      | £75.00  |
| 3Mb                      | £105.00 |
| <u>A3000</u>             |         |
| 1Mb*                     | £55.00  |
| 3Mb**                    | £156.00 |
| 1-3Mb Upgrade            | £135.00 |
| A5000                    |         |
| 2Mb                      | £124.00 |
| Prices shown are Ex, V.A | .T.     |
| *Upgradeable to 3Mb      |         |

\*\*Gives 3Mb using only 8 chips

Orion Computers Ltd., 250 Leyland Lane, Leyland, PRESTON, PR5 3HL. Tel: (0772) 623000

# TELETEXT ADAPTOR ADD TELETEXT TO YOUR COMPUTER

- Computer controlled tuning
- Download and save pages
- Unique composite video & audio output
- High performance T.V. front end
- Fully mains powered unit in metal case
- Upgrades available for existing users
- RISC-OS version multitasks
- User programmable via SWIs & OS calls

The ARC/3000 version contains many powerful features making it very easy to use, i.e. point and click at page numbers. SAE for details



**FURTHER DETAILS ON REQUEST** 

A3000/ARC. PRICE INCLUDES:

- Podule socket lead User notes
- TTX V2.13 Software

£94.00

BBC B & MASTER, PRICE INCLUDES:

- User port lead SATS Software
- User notes

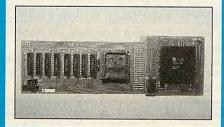
£94.00

#### A305/310 4 MEG MEMORY UPGRADES

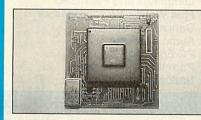
- Low power 8 chip design DIY fitting, just plug in
- Accepts our ARM 3 processor

£243.00 Inc. P&P SPECIAL OFFER: Fitted with ARM 3 (as illustrated below)

£443.00 Inc. P&P



# ARM 3 **PROCESSOR**



- Cache operation at 25 MHz
- RISC-OS Armspeed software
- DIY plug in design Fits A300/400 series
- 3-5 times speed increase

£195.00 Inc. P&P

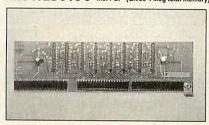
#### A3000 MEMORY UPGRADES

- Low power design, only 8 chips
- Bare Board, 1Mb or 4Mb Easy to fit just plugs in
- Screw fixed for reliability PCB size only 175x50mm

BARE BOARD £23.00 Inc. P&P

1 MEG £51.00 Inc. P&P (Gives 2 Meg total memory)

4 MEG £139.00 Inc. P&P (Gives 4 Meg total memory)



#### UVIPAC EPROM ERASER

- Mains Powered
- Cost effective way to erase Eproms
- Up to three Eproms can be erased at any one time
- Available with or without automatic timer

EPROM ERASER £23.00 Inc. P&P.

WITH TIMER

£27.00 Inc. P&P

#### MEMC1A

MEMORY CONTROL UPGRADE (2 CHIP SET)

- Boost speed by 10% on A310/440
- Recommended for ARM3 use
- Essential for SCSI & floating point users

£38.00 Inc. P&P

#### **UVIPROM EPROM PROGRAMMER**

- For BBC B and Master
- Programs 2764, 27128 & 27256 (Inc. CMOS)
- 21 or 12.5 volt programming
- High quality ZIF socket
- Fast or slow algorithm

£33.00 Inc P&P

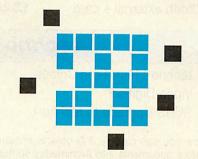
FOR FURTHER INFORMATION TELEPHONE 0635 524008 OR 0622 747416 HOURS OF BUSINESS: 9.00 AM - 5.30 PM (24 HOUR ORDERING FACILITY)

Prices exclude VAT, but include carriage charges (UK mainland), packaging and insurance





**DEALER ENQUIRIES** WELCOME



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GROUND CONTROL

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ACORN CATALOGUE

# ECHNOMATIC

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# rchimedes computers

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A new 9" by 6" tablet with captive 3 button stylus, perfect for sketching and for special needs applications.

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The original 12" by 12" technoTablet with fourbutton puck. The puck cross-hairs allow accurate tracing of drawings.

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£109(b) technoTablet 9 £179(a) technoTablet 12 £329(a) technoTablet 18 Optional Stylus for technoTablet 12 £15(c)

# What we offer in addition to efficient sales service and professional backup!

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A new range of Learning Curve packages featuring the A3000, A420/1 and the new A5000. See price table on left.

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A3000, Upgraded to 2Mb Lemmings and Pacmania First Word + Wordprocessor Genesis II Database **Audio Cassette** PC Emulator Parents Guide to the National Curriculum

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★ SVHS Upgrade to techno-I

\* Canon ION CCD Camera and accessories

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Now you can capture 3-D objects in full colour and also set up a rostrum camera to convert colour documents into Archimedes sprites. The Canon ION has rechargeable batteries so you can wander where you like taking up to 50 pictures, storing them on its floppy disc. They can then be digitised using techno-I to provide the best images available on Archimedes computers.

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# techno-I

The techno-I Real-Time Colour Video Digitiser for Archimedes computers is one of the most advanced video digitisers available, with features found only on top-of-the-range models for the IBM PC.

The techno-I card, with RISC OS multitasking software, allows you to grab a picture from a video source (TV, Video recorder, etc.) and convert it into a sprite. This can then be dragged to RISC OS applications such as art or DTP packages.

Unlike simple RGB video digitisers, technol handles colour in 25 bits with 7 bits luminance and 18 bits chrominance. By manipulating the image using hue, saturation and luminance, it mimics the human visual system. The colours are therefore truly WYSIWYG. techno-I will also give true monochrome representation of colour images.

The on-screen viewfinder displays live colour or monochrome in real-time. The viewfinder can be either 1/16 or 1/4 screen area, and can be offset vertically and horizontally under user control.

The frame buffer resolution is up to 512 by 512, with programmable vertical and horizontal resolution. Complex frame manipulation features are built into the hardware including options to grab the current frame or previous frame and grab the last completed frame.

All viewing, video and digitising parameters are software controlled, there are no presets, no setting up, simply connect to a video signal, load the software and digitise!

#### techno-I features include:

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- ★ SVHS input upgrade available

"a big improvement on the best available from previous digitisers" *Trevor Attewell, Archimedes World* 

"...surprisingly good value compared to the rest of the field" *Rob Millar, Acorn User* "Using techno-I is a doddle ... an excellent and easy to use product" *Steve Bruntlett, The Micro User* 

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# rchimedes SOFTWARE

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#### PD400/PS351 are Compact/Archimedes compatible.

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#### techno CAD for Master 128

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Novacad can drive a plotter to produce drawings of highest quality ... Novacad is excellent. It is flexible, genuinely easy to operate without much practice, ... and a pleasure to use. Deebug Dec86

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**BBC B compatible** BBC B+ compatible

M Master compatible

Master Compact compatible

**Electron compatible** Archimedes compatible A

BBC A3000 compatible

#### ■★PRIZE £20★□

#### NARROW MINDED

B It's often desirable to get more characters across a screen than will normally fit. Mode two on eight-bit C machines provides colours which can be a a great advantage in games and other programs, but you can normally only get 20 characters horizontally and these are so wide they look like they've been run over by some piece of heavy-duty road-making equipment.

What's the solution? Well, Martyn Ayshford of Cullompton in Devon came across a piece of code he wrote some time ago. It reduces the standard 8×8 pixel character to four pixels wide.

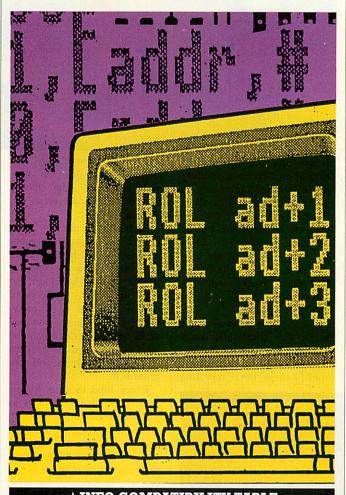
ThinText, His program, works by reading a character's definition (using faithful old OSWORD 10) and carefully shifting the bits out, picking every other one. Because characters are having their widths halved, they are dealt with in pairs - each pair of standard characters being shrunk to form a single new one, which is then plotted. This method keeps the code short and quick.

Because Martyn's program reads and redefines characters legally, it will work on all eight-bit machines with shadow Ram and second processors and will also function correctly with all the 6502 emulators on the Arc.

It is also mode independent - as you will see by the short demo routine included. Although the characters are

#### DAVE ACTON and DAVE LAWRENCE

deliver their monthly mix of bits and pieces for your eight and 32-bit machines



| LISTING | NAME       | BBC B         | MASTER | ELECTRON      | ARC |
|---------|------------|---------------|--------|---------------|-----|
| Info 1  | ThinText   | *             | *      | *             |     |
| Info 2  | PropText · | *             | *      | *             |     |
| Info 3  | Blindflies | V seed to     |        |               | *   |
| Info 4  | Plasma     | elisatives at |        |               | *   |
| Info 5  | MindMaster | *             | *      | *             | *   |
| Info 6  | ArmTree    | middle All    |        |               | *   |
| Info 7  | Snowflake  | *             | *      | *             | *   |
| Info 8  | DTSrc      |               |        | No. of London | *   |

only four pixels wide, they are surprisingly readable. Even in mode zero (where you get a staggering 160 columns of text) the individual letters are clearly distinguishable.

In keeping with the idea of getting more characters per screen row, we were prompted by Martyn's submission to dig out another example. PropText displays character proportionally spaced on the screen. Unlike Martyn's program which guarantees to double the number of characters per line, PropText cannot do the same, although typically you'll get about 25 to 35 percent more with no reduction in letter quality. In fact, the display is 'prettier' since thin characters like 'i' do not have large areas of space on either side.

Like ThinText, PropText uses OSWORD 10 to read characters' definitions. routine .buildtable uses the call to build up three tables. These contain the width of the character and the size of the blank borders on the left and right hand sides.

The routine .length returns the length of the string stored at word%. The length is in pixels (including spaces between letters and words) and can be used to centre text, as in the example. Before the text is plotted, you must issue a VDU 5 command to ensure that characters are plotted at the graphics cursor.

Plotting by this method is slower than in Martyn's program but this is the only easy way of getting the desired effect legally (which means without resorting to poking the screen directly).

The routine .prop actually puts the text on the screen. The graphics cursor is moved to the left to take account of the left border of a character, then the character is plotted and finally the cursor is moved left again, if necessary, in order to close up any gaps on the character's right.



It should be easy enough to adapt the routine for use in your own programs, although as it stands the code works only in mode one or mode four (40 column modes). To use it in mode zero, you will need to remove the \*2 at line 230, remove the ASLA at line 770 and change the LDA #4 at line 790 to LDA #2.

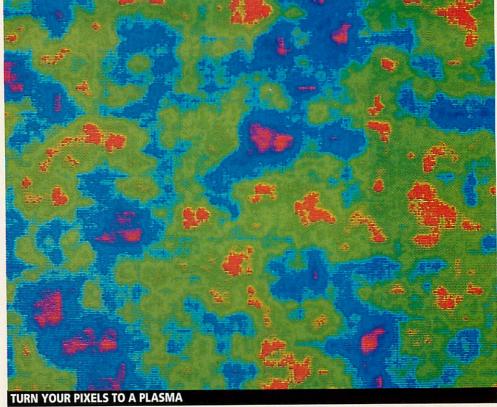
To adapt the program for mode two or mode five change the \*2 at 230 to \*4, add another ASL A at line 775 and change the LDA #4 at 790 to LDA #8. Of course, you will also need to change the MODE 4 at the start as required.

#### **→** PRIZE £50 ★

#### HIGH FLIER

Our winning program this month is the amusing fly B simulator from Barry Wickett. The flies are c blind but they have excellent stereophonic hearing, E and it's by using this, that they manage to find each other. When they feel lonely they make little honking noises, which the others follow to find their lonely friend. If the noise is close they are likely to acknowledge in a similar fashion. Eventually all the flies find each other and form a group, happily dancing around each other, making little noises to make sure that the others are still there.

Just when all seems fine and dandy and they think that they can live happily ever after, like in all good fairy tales, a baddie (boo, hiss) comes along and



spoils their fun by shooing them in all directions, spoiling their new-found community. (a big 'ahhhh' here). But all is not totally lost, they can run much faster than the baddie and soon manage to escape. But eventually, alas, the baddie catches up by listening to their merry honks and soon splits them up again - and so it goes on.

For the viewer, unaware of the the flies' great suffering, it is rather nice watching the live 'ballet' being performed in front of them, never repeating itself, and listening to the stereo chorus that the flies merrily make. The theory behind it all, however, is not quite as romantic.

Each fly randomly flies around the screen, possibly making the odd hoot, waiting to hear a fellow fly make a similar noise. The closer the other flies are to it, the more chance there is of a reply. When a fly makes a hoot, all of the other flies (including the baddie) remember the position that it was made at and aim towards it.

Every time there is a new hoot, they all aim towards it. The closer the flies get to each other the more hoots there are and so they form a group. But when a baddie makes a hoot they aim for a position in the opposite direction to that hoot. Thus they are scattered. It's all quite simple really.

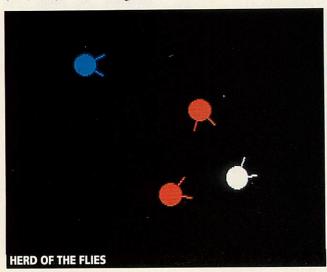
The usual screen swapping technique is used to aid smooth flight and the effect of the flies' hoots is greatly enhanced if you switch the internal speaker off and use either stereo headphones or speakers, as the position of the fly in the x direction when it makes a noise is reflected in the stereo position of the sound channel.

This program follows on where Jonathan from Lynch's Flocking (Risc Revue, December 90) and Bryan Creer's Herding (Risc Revue, June 91) left off. Unfortunately, due to the large amount of calculations that need to be performed, the program will only run on 32-bit machines; we would very much like to see a fast eightbit version.

#### **■★PRIZE £25★**

#### PLASMA CLOUDS

B Phil Le Sueur of Stockport provides this Arc B version of a PC public M domain demo. As he says, C the effect of swirling clouds of plasma is dif-E ficult to describe, so it's best to just run the program and watch the result. The basic idea is simple. A pattern of clouds is built up on the screen. Areas of different colours are created in such a way that they merge smoothly into each other. When the whole pattern is complete the colours are cycled and the clouds appear to grow and



fade as part of an endless sequence.

When you first run Plasma you are asked for five parameters - just press RETURN for suitable defaults. The graininess determines how quickly the colours change from pixel to pixel across the display. A low value will result in large swirling areas; a high value quickly changing peaks and troughs. Next you can specify the displayed area. To plot the whole screen enter 1280 for the y size and 1024 for the X. Finally, enter the pixel size. A pixel of one by one is the smallest possible - try larger values for a chunkier effect.

As Phil points out, it would have been nice to alternate the colours by changing the palette. However, the Arc has limited facilities for doing this and although the mode used supports 256 colours, these can only be altered in a very limited way.

Instead, a look-up table of colours is used. Every time a colour is altered, the next value from the table is found and poked on to the screen. Because this has to be done for each displayed pixel, some fast machine-code is required and indeed, Phil has made the code even faster by expanding the central part of the loop so that a whole line of pixels can be cycled, without the need for a branch instruction (which are quite slow to execute).

The plotting routine is a little piece of recursive Basic (\*INFO readers do like their recursion, don't they). This repeatedly divides and subdivides the screen into rectangular shapes and fills them with a colour that is calculated using Phil's own algorithm. Although this is not the same as the PD version, the results are just as good.

Incidentally, any variations on this theme are most welcome. In particular, if you have the patience to write the initial screen plotting routine in zippy machine-code or speed up the cycling yet more (by using multiple load and store instructions perhaps) we'd like to see the result. All programs and ideas to the usual address please.

#### → PRIZE £20 →

#### MINDMASTER

B Do you remember that game with the little brown B board and the pegs that everyone got three copies **c** of for Christmas about 15 E years ago? Well, even though I played it more or less constantly for several months as a child, I still find the game fascinating enough to thoroughly enjoy this version from J A McHugh.

For the few of you Santa left out that year, the rules are quite simple. The computer picks a random sequence of colours from the list shown. You then try to guess the sequence by giving sequences of your own. Each guess will be given a rating. A blue block means you have guessed the colour and position of a 'peg' correctly. A white block means you have got the colour right but the position wrong. When you get a reply of four blue blocks you know that you have guessed the sequence correctly. If you haven't guessed after eight tries, you lose the game and the code is then revealed.

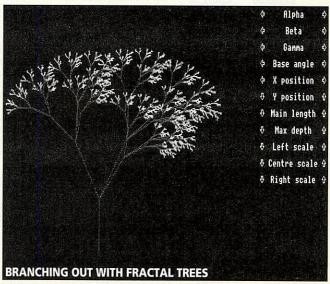
You have the choice at the start of allowing double colours. This means that the secret code may include two or more pegs of the same colour and this will make it more difficult to guess.

We'd be interested to see any good (and concise) computer-play routines to add to this game. If you can get your machine to reliably deduce your code, send your program in and we'll happily publish the best.

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#### TREE PIECE

Nature has featured extensively in \*INFO since the B column's conception and presents constant challenges to humble program-C mers like ourselves to E emulate its finer points. Recursion - the repetition and 'sub-repetition' of an idea - is commonly used when simulating natural phenomena



(trees, ferns, coral, even coastlines - all are recursive by nature) but recursion can often be quite slow. For this reason. it is often difficult to predict the finished product of a 'natural' recursive program.

Daniel Tray has come up with a speedier example though, and the beauty of his program is that you can alter the way nature 'works' and see the results almost instantly. His ARMTree listing plots a recursive tree. From a central trunk, three branches sprout and from each of those, three more. The process continues until a specified 'depth' is reached and the various layers of growth are coloured appropriately to give the appearance of a 'real' tree.

On the right of the screen is displayed a set of parameters each with arrows. You can alter any of the values shown by clicking with the mouse on an arrow. The tree will then be redrawn and you can see the effect of the change. We think you'll find the demonstration particularly useful if you are still trying to get to grips with the whole idea of recursion.

The X and Y positions simply dictate where the tree sprouts on the screen. The base angle is the angle between the trunk and the ground. Three more angles can also be altered: alpha, beta and gamma. You'll recall that each branch splits into three smaller ones and each of these into three more. Each time a parent branch produces three offspr-

ing the angles at which they diverge from the parent are alpha, beta and gamma.

Altering the main length changes the overall scaling of the tree (that is, how much smaller each sub-branch is than its parent). You can also individually alter the scaling factors for each of the three possible directions branches may take - these are listed as left scale, centre scale and right scale on the screen. Finally, you are also able to increase or decrease the maximum depth of the recursion how many times a branch will divide and subdivide.

The heart of Daniel's program is in machine code as it needs to plot the tree as quickly as possible. It is similar in structure to many programs we've carried in the past. The routine tree plots a branch, then calls itself three times to plot the three subbranches. With each call to itself, 'local' variables are preserved in a stack. This means that, having plotted a subbranch, and any sub-branches from that, the program remembers where it was and can carry on and plot the rest of the tree correctly.

Daniel's listing is legal in that it uses the OS\_Plot call to draw each part of the tree. If you were to incorporate your own line-plotting routine that poked the screen directly, it would be possible to draw the tree even faster. We'd be delighted to see (and possibly publish) any This is left as an



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SNOWFLAKE

John Knowles has supplied us with Snowflake a little graphic doodle that works on all machines. Simply enter the number of points and a 'divide by' value and watch the pattern build up. Values of two and two will provide the familiar Sierpinski Gasket. Values of six and 1.6 will create a rather nice snowflake (hence the title).

In fact, the program is an extension of the original Sierpinski theme. Given n points arranged in a circle about the centre of the screen, start at point one and repeatedly pick another point at random. Move towards this point (the distance you move is determined by the 'divide by' value) then pick another point and move towards that. Keep picking points in this way.

Although the whole journey is apparently random, the pattern created has a very well defined structure as can be seen in the snowflake

#### MODULE TASKS

If you take a look at the Task display window B you'll see that it groups the currently active tasks c into two sections; Application tasks and Module tasks. Application tasks are programs such as Edit or Paint that load into application memory starting at &8000. If you write a multitasking program in Basic or C, you'll be writing an application task.

Module tasks, on the other hand, run from within the RMA and must therefore be written in code. They tend to be desktop utilities rather than applications, full blown although this is by no means a concrete rule. The filers, palette and task manager itself are all module tasks.

There are two main advantages of module tasks over their application counterparts. Firstly, they only use the memory that they are loaded into (application tasks use 8K or 32K chunks at a time,

depending on your machine size) and, secondly, as modules are not cleared when you quit the desktop, these tasks will re-initialise themselves when the desktop is started up again.

Writing a module task from first principles is quite a tricky business, the Programmer's Reference Manual describes itself as providing: '..the special requirements module tasks, but not how to write modules from scratch. As we're in the business of unravelling the depths of Risc OS, we've done all the hard work and come up with a fully working module task demonstration for you to examine.

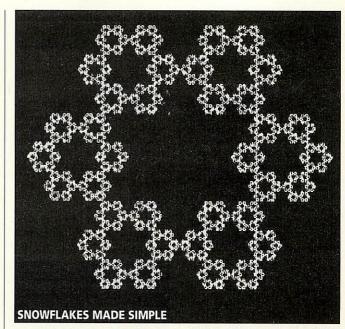
The DoubleTake module provides a couple of useful functions for moving round directories and examining files. Double clicking and holding a mouse button over an application will open a directory viewer for that application instead of running it (the same as double clicking whilst holding down the SHIFT key). A similar action over any file will load that file into Edit (if it is loaded). This is very handy for examining Command or Obey files.

So how does all of this work when you get down to the programming level? Well, the first part of the code (up to .ServiceCode) is a standard module header. Note that all entry points (except those to do with SWIs) are used.

When the module is first loaded, .InitCode is called. It claims 300 bytes of RMA (Relocatable Module Area) as workspace and marks the task as being inactive (taskhandle is set to zero).

Next comes the star command handler. The star command is provided for internal use only and is usually prefixed by Desktop\_. We'll come to this later. All this command needs to do is issue an OS\_Module 2 which causes the module to be entered as a language, through its start code entry point.

The start code has a similar structure to a normal task that is an initialisation phase followed by a Wimp\_Poll loop. Our example starts by check-



ing the stored taskhandle. If this is non-zero, it means that the code is already running and the previous incarnation is then told to go away with Wimp\_CloseDown. Wimp\_Initialise is called to set up the task and taskhandle is updated with the returned value.

Next comes the Wimp\_Poll loop. DoubleTake is only interested in a couple of wimp messages, so the mask supplied in R0 ignores many of the possible return codes, Message 0 is quit, so the task calls Wimp\_CloseDown to close down and zeros taskhandle to mark itself as inactive. OS\_Exit is then called to quit finally. The other message that this loop waits for is number five -Message\_DataOpen.

This is sent when the user double clicks on a file. The programs reads the clock and then goes into a little loop, reading the mouse and the clock. If the mouse button state ever returns to zero then the user has stopped holding the button and control returns to the Wimp\_Poll loop. On the other hand, if the time read is more than 20 greater than the original time read, then further action must be taken.

First, the message is checked to see if it was in fact sent by DoubleTake. If so, nothing more is done otherwise the message acknowledged. Table one shows what the rest of the

message block contains. The file type is checked, if it's less than &1000 it's a file, &1000 is a directory, &2000 is an application. For both of these latter types, a directory viewer needs to be opened. Message Filer\_OpenDir is used for this purpose, but first a little jiggery-pokery needs to be performed. If the user double clicks with the Adjust button, the parent directory viewer needs to be closed.

There doesn't seem to be any neat way of doing this, so the full pathname is searched and truncated before the final leaf name. A Filer\_CloseDir message is then sent with this string. Finally, the full pathname is restored and the Filer\_OpenDir message sent. This doesn't quite perform the same effect as when a directory is opened with Adjust, as the new directory viewer will appear in a different place from its parent.

If a file is double clicked, a little sneaky trick is used; the DataOpen block is altered so that the file type is &FFF (text) and the message re-broadcast. If Edit is loaded, it will therefore now think the file is a text file and load it in. Luckily, Edit checks the file type itself and the save box that it provides will contain the correct file type icon.

There are two last parts to the module. The first is the finalisation code. This simply



checks if the task is active and if so, closes it down. It also frees up its RMA workspace.

The last part of the module deals with service calls. There are a dozen or so calls that may be issued, but we are only interested in three of them. Service\_StartWimp (&49) is issued by the \*Desktop command to start up any resident modules.

Remember that the star command is for internal use only? Well, this is where it is used. You should return with R0 pointing to the module's star command and R1 set to zero to claim the call. (The call is issued repeatedly until no one claims it.)

A slight problem can arise if a module task does not successfully start. This can be avoided by temporarily setting taskhandle to -1. The code at the beginning of .StartWimp then only sets R0 and R1 if taskhandle is zero, therefore ignoring any dodgy modules.

So that these modules are given a second chance, two other calls are issued; Service\_StartedWimp (&4A) is

issued once all the resident modules have been started up and Service\_Reset is issued in the event of a soft reset. In either of these cases taskhandle should be reset to zero.

If you'd like to write your own module task, then you could delete the lines between repeat and .FinalCode and use this as a framework. As always we'd be very interested to see any of your efforts.

#### \*QUIT

Well, that's it for another month. Too many programs and not enough space. We did

#### CONTENTS OF DATAOPEN MESSAGE BLOCK

R1+20window handle of directory display containing file
R1+24unused
R1+28x-offset of file icon
R1+32y-offset of file icon
R1+360
R1+40file type
R1+44full pathname of file,
zero-terminated

not even have room for the usual collection of one-liners this time, so you'll have to wait until the February issue to see Adrian Dale, Gavin Sallery and Gareth Moore's minipieces. How can you possibly stand the suspense? (Hint 1: why not fill in the reader survey opposite. Hint 2: write an amazing program and send it into ★INFO).

Dave Lawrence Dave Acton

Please send your submissions to \*INFO at the address given opposite. All but the shortest of programs should be on disc and accompanied by a brief description of their purpose and operation.

A stamped addressed envelope enclosed with your submission will ensure the safe return of your disc.

#### READER SURVEY

We try to cater for everybody's needs in ★INFO and after seven months of the combined eight-bit/32-bit column, we would like to know if we are, in fact, offering you the right sort of things.

We would also like to take this opportunity to find out from readers what equipment and software they use. With this information we will be able to cover more fully those areas which readers are interested in and therefore, we hope, provide a better service to everyone.

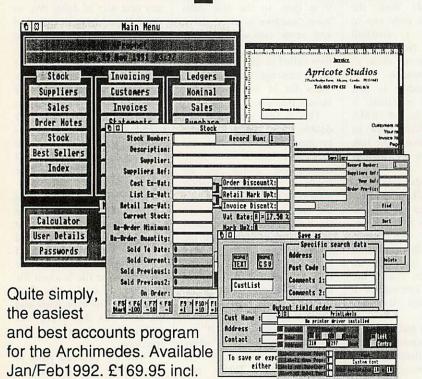
Please send your survey entries including any special suggestions to:

★INFO Survey BBC Acorn User 20-26 Brunswick Place London, N1 6DJ

All survey responses should reach us no later than Friday 24 January 1992.

Please turn to page 55 and fill in our reader survey form (photocopies of the page are perfectly acceptable). As an incentive, the first 10 entries picked out of the hat will receive a free subscription to both the magazine and monthly disc.

# Prophet



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| 1 🗆     | BBC Model                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | В                        |                                    | 0       |       |          | Doe      | s *Info cater adequately for your machine?                                         |
| 2 🗆     | Master 128                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |                          |                                    | 1       |       |          | Doy      | you type in ★INFO listings?                                                        |
| 3 🗆     | Compact                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |                          |                                    | 2       |       |          | Doy      | you modify the programs for your own use?                                          |
| 4       | Archimede                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | s/A3000                  |                                    | 3       |       |          | Doy      | you prefer ★INFO to Risc Revue and Eight Bits?                                     |
| 5       | Other                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                          |                                    | 4       |       |          | We       | try to provide versions of all ★INFO programs for all                              |
|         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                          |                                    | 5       |       |          |          | you a competent Basic programmer?                                                  |
| 2. WI   | hat peripher                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | als do you own o         | r use?                             | 6       |       |          | Are      | you a competent machine code programmer?                                           |
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| 2 🗆     | Laser print                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | er                       |                                    | 8       |       |          | Doy      | you prefer the desktop to the command line'?                                       |
| 3 🗆     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |                          |                                    |         |       |          |          |                                                                                    |
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|         | The state of the s |                          |                                    | 2       | ō     | ō        | ā        | Programming techniques (such as sorting)                                           |
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| 3. Do   | vou own a                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | ny of the followin       | a: (bren tid 2                     | 4       |       | ō        | ō        | Utilities                                                                          |
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# DATA BASICS

The information age has arrived, but some people are still missing out. **DAVE FUTCHER** puts the records straight

businesses, no matter how small, need to keep and maintain records and, in recent years, computers have provided a solution to record management.

The Archimedes in particular, with its large capacity for memory and processing power, has proved ideal at handling the vast amounts of information which can then be sifted through at high speed.

Powerful and versatile database management programs have evolved, fulfilling two main purposes: firstly, data can be entered and retrieved, as well as updated; secondly the software enables the filed data to be manipu-

lated by searching and sorting, to output reports, summarise information, print invoices, or calculate.

At its simplest level, a database is like a 24 + 8 Bits (Fornat) card index. In a company, to keep account of every employee, each person would have a dossier recording his or her name, Create File/Fornat address, date of birth, position, income, and so on. In a database an individual's card is called a record; each record contains fields in which the details (name. address, date of birth...) are recorded. A collection of records is called a file.

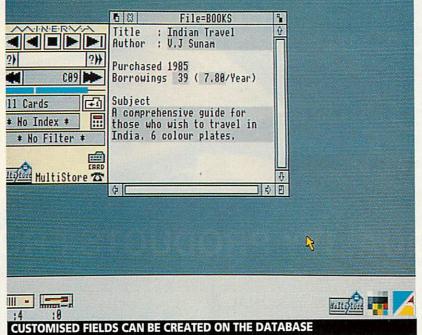
A database management package should provide facilities to add and edit records, sort by specified fields and EACH FORM CAN BE TITLED SEPARATELY

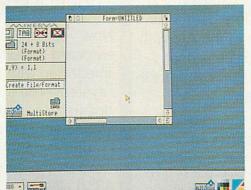
extract records that match a specified criteria.

#### SETTING UP

Before creating a database file with any database management program, think carefully about the type of information to be stored and the design of the card that will hold it. It is a good idea to do this on paper initially, deciding on the length of each field and the order of data entry.

How the database is set up will depend on the individual program being used. As an example, I have chosen Minerva Software's MultiStore program. From the main MultiStore menu .the Create option is selected, bringing up a window





where you can design the card layout, entering the fields to be filled. If you are setting up, say, a company information file, the fields would probably be the company name and address, the telephone and fax number, a contact name and so on. Each field needs a label so that the user knows what information to enter and where. To create one for the first field, place the caret in the window and type NAME followed by two spaces and a colon, then RETURN. Each field can be of a pre-defined length, established by typing in a number of @ or + symbols. So, for the name field, you might type in 20 of either of

these symbols. Names rarely exceed 20 characters - so allowing space for any more would be a waste of useful memory.

The characteristics of the field can be defined by placing the pointer over this row of symbols and clicking the mouse to bring up the Field information dialogue box. Fields can be added in the same way until the record layout is complete.

You can then click on Create file/format in the Tool box to create the file where the layout will be situated. As part of this, the size of the file has to be defined in number of cards or kilobytes. To enter data into a file, drag it from the directory on to the MultiStore icon. After

it has loaded, the Open file window will appear. Click on OK - after a short while the Browse and File windows will appear. To add a new card to the file, click on the Add card icon.

Standard edit facilities are used to enter data in each field. Press RETURN at the end of a field to move the cursor on to the next field. Default type fields, set when creating the card, are skipped over. To prevent typing in the same information repeatedly, save it in the notepad and just copy it over. To complete an entry click on the Stop icon or press RETURN in the last field. Pressing CTRL-A after entering the data in the last field saves the record and opens up

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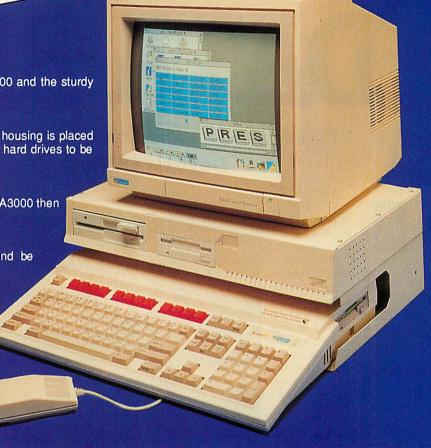
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another blank one, so you don't have to click the Add card icon every time. It is easy to look through files created in MultiStore. To the left of the Browse window is the Tool box containing icons which look and behave like the controls on a video player. There are icons for the start and end of file, and others for moving forwards and backwards one card at a time.

While you browse through the cards, a white marker on the file gage indicates the position of any selected record in relation to the rest of the file. The number of the record in the file also appears just above the gauge. To

move continuously through the cards use the fast forward and reverse icons.

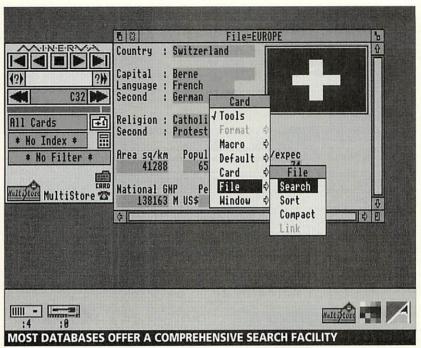
MultiStore provides several ways to find one or more particular cards. The easiest way is the Fast find option in the Tool box. If you are looking at a file containing details about a set of library books and wish to locate all the books regarding Nelson, click the Fast find box and type in NELSON, then click on the Find card icon. Once the first book has been located, click on the Find next icon to find the next card referring to Nelson.

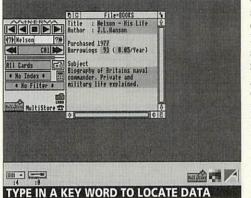
More complex searches can be made which will allow the result of the search to be saved as a subset of the main file. Say, for example, you are looking at the file about the countries in Europe and wish to find the ones whose religion is Catholic. You would first double-click the Clear icon to remove the existing expression and then drag the Religion field from the card and drop it into the search expression box, where @Rell will appear. The Contains icon is then clicked on and, at the ready positioned cursor, CATHOLIC is typed. If the OK icon is clicked the search begins and a Searching cards window will appear. When finished the last card will appears in the card window. Subset B appears in the Subset icon and, if you browse through this file, only countries that are Catholic will be displayed.

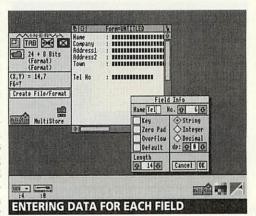
#### POPULAR PACKAGES

There are a number of packages available, at widely varying prices, which allow you to manage your information effectively.

AlphaBase has its roots in the popular Beta Base eight-bit database package for the BBC micro, although it has improved in appearance, ease of use and facilities. It also uses Clares own colourful icon system, developed for Artisan. It costs £43.80 for the Archimedes, and is available from Clares, 98 Middlewich Road,







Rudheath, Northwich, Cheshire CW9 7DA. Tel: (0606) 48511.

Base 5 DBMS is a programmable database for software developers. At its heart is a powerful set of Basic procedures and functions to allow programmers to design databases to specifications. It is not a database manager with a programmable language tacked on, but a multi-tasking front end called WimpBase allows the package to be used as a database if you want to write your own applications. It costs £69 from Base 5, PO Box 378, Woking, Surrey GU21 4DF.

Desktop Office is a fully integrated package

covering wordprocessing, databases, spreadsheets, charts and comms, each existing as separate Risc OS applications. Modelled on a card index, it uses video style icons to move easily through the records. Datafiles can be searched and groups of related cards formed. Reports consisting of all the cards in the file or a previously searched group can be created, printed and exported to a disc or another application. For an all-purpose office system then Desktop Office provides the tools; but if you have a serious requirement to handle data you will probably need to upgrade to a more powerful package. It costs £85 from Minerva Software, Baring Crescent, Exeter, Devon EX1 1TL. Tel: (0392) 437756.

The previously mentioned MultiStore is a relational database which allows many files to be open at one time. It is possible to link more than one together and look at, for example, a datafile of books and a separate file of authors with the information displayed alongside. It has genuine internal multitasking and therefore you can perform a sort on one file and search another, while loading and browsing a third.

There are key fields for instant searches, indexes to allow file browsing in more than one order without searching,

fast sorting by single field or complex expression and truly comprehensive reporting facilities. Its relational report writing and mailmerge facilities means it is ideal for the most demanding and complex applications. The capacity of the package in terms of separate records is enormous and the field size is beyond the limits of what most users will need. However, its ease of use makes it just as much at home creating the most complex business application, such as stock control. It costs £199.

Flexifile is similar to the more sophisticated MultiStore package, without the more complex functions. However, it is still a relational database and multiple files can be open at the same time, although there can only be linking between two files. It costs £99 from Minerva.

Flying Start 2 is an import from the PC world where it proved popular. Although it does not run in a Wimp environment, it is nonetheless, a well thought out database system. Both the use of indexes for file access, and the facility to link files are a real asset. It is £86.91 from Mitre Software, International House, 26 Creechurch Lane, London EC3A 5BA. Tel: 071-283 4646.

PipeDream is said to break down the barriers between database, wordprocessor and spreadsheet. Strangely enough, however, the database functions of PipeDream have been ignored. Many people write off the facilities, claiming that they are a long way short of a full database manager. But in some applications it offers more than a conventional system.

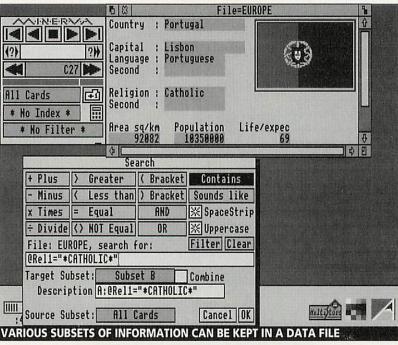
You can use the whole of the potential spreadsheet area to hold your data by using the rows as records and the columns as fields. Records can be single or multi-row and the number, length and type style can be changed very easily. The data can be sorted by marking the area and issuing the sort command CTRL-BSO; the search command CTRL-SE can be used to find a record and it is also possible to print and save the various rows which meet the criteria.

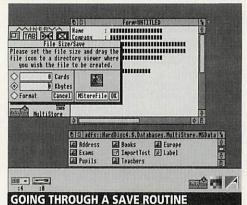
The latest version costs £196 from Colton Software, 2 Signet Court, Swanns Road, Cambridge CB5 8LA. Tel: (0223) 311881.

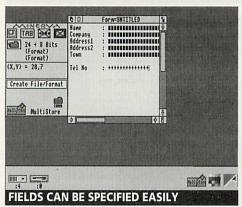
Another Archimedes database package that had its roots in a BBC micro package is System Delta Plus. Strictly speaking it is a set of sophisticated database commands which can be used in conjunction with Basic to build a tailor-

made database in a similar way to how DBase is used on the IBM PC/compatible. It is supplied with a complete application designed in this way, the WIMP Card Index, but there are also add-on support packages available. Reporter and MailShot will enhance and support the facilities of the card index program. The price is £59 for System Delta Plus, and £29 each for Reporter and MailShot from Minerva.

Pinpoint provides a form designer which will not only help users to collect the relevant information but is also an easy means of input for the resultant data. This is then automatically converted into a database where it can be analysed







for patterns and correlations, and a range of graphs plotted. It is therefore the complete tool for anyone who is working on opinion surveys, or looking at performance figures, experimental observations. statistics and even election results. The database costs £99 and is available from Longman Logotron, 124 Cambridge Science Park, Milton Road, Cambridge CB4 4ZS. Tel: (0223) 425558.

The ease that a database can be set up is of crucial importance and Squirrel from Digital Services must be one of the easiest. The pointer is positioned where the field should start and

dragged to where it should end. As the button is released a dialogue box appears, requesting details about that particular field. The searching of records is just as easy to organise through Query forms. Squirrel uses modern indexing techniques to ensure that you get super fast searching every time. You can even change your query into a flow chart, with filters showing which records are chosen and which are filtered out. Although Squirrel lacks the relational capabilities of MultiStore for example, it will suit users who want a powerful database but who find the setting up of the fields and records quite difficult. It costs £129 and is available from Digital Services, 9 Wayte Street, Cosham, Portsmouth, Hants PO6 3BS. Tel: (0705) 210600.

Some of you may also be interested in specialist databases for storing and retrieving textual material. Archimedes users have two possibilities - Hyperbook from Longman Logotron and Knowledge Organiser from Clares. Hyperbook is a text retrieval system designed to help users do more effectively what they can already do with printed books. It can scan text, provide lexical information and print out either. Its special indexing system allows users to carry out sophisticated

searches of the text, retaining the results in a way that assists the researcher in developing multiple themes and following up cross references. A variety of text databases are already available covering themes in literature, history and the environment. Prices are £49 for the Reader and £15 to £25 for text files from Longman Logotron. Knowledge Organiser is £55.30 from Clares. For further details on any of the databases mentioned, contact the suppliers. All prices exclude VAT.

Next month, we will be looking at the various spreadsheet packages available for the Archimedes.

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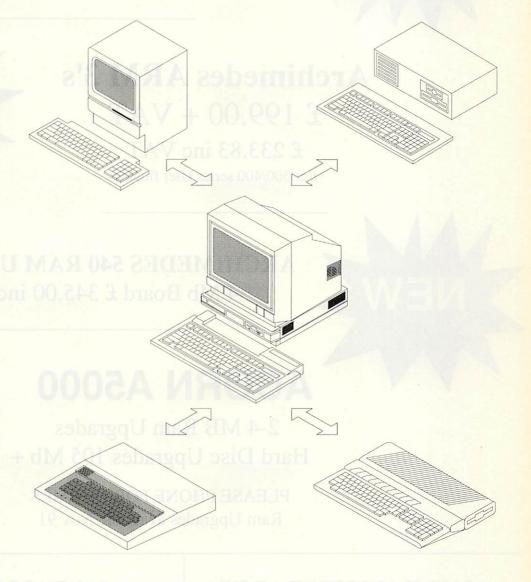
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# TTACK

Classic graphics take centre stage this month: plot a new course with our objectoriented drawing program, or make a splash with a spot of painting

eeb users can be forgiven for thinking object-orientated graphics is only possible on fast, expensive machines such as the Archimedes. In fact, despite its age, the Beeb is quite capable of some relatively sophisticated manipulation. object For example, Jonathan Baldwin's Super Plot, which first appeared in the November 86 issue, showed that even in mode 2, it is possible to create, move, stretch and rotate line drawings. Once an image has been drawn it can then be dumped on to a plotter, with all the increased resolution that this offers. Or, if you prefer, it can be converted to any mode

you wish and then loaded into a 'conventional' painting program to be coloured in.

There are two listings on the yellow pages for Super Plot. The first, SPsource, assembles the various transformation routines and only needs to be run once to assemble the code. Super Plot is the main part of the program. It runs at &2300 and stores all its data from &1500 upwards; it will not therefore run on a standard BBC or



Electron with ADFS.

Assuming you enter both listings correctly, running Super Plot will present you with a blue with screen three options. Option 3 will load a saved file if no screen image exists; if a screen image does exist press 2 instead. Alternatively, press 1 to enter the editor. Here, press SPACE to start rubberbanding a line and use the cursor keys to move the end point. F1-F3 control the speed of the cursor. A second press of SPACE will fix the line, RETURN will discard it. Existing points on the screen can be joined by pressing F5. Use the left and right cursor keys to move the box to the desired point,

press RETURN, then move to the end point and press RETURN again. Misplaced points can be corrected with F7. Select the point with the left and right cursors and RETURN, as with line adding, then move the point as necessary with the cursor keys. Pressing RETURN again will fix the point again. Two routines are provided for deleting lines. F6 will remove a complete line; select the line with the left and right cursors and



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press RETURN to remove the line. Press F8 to get the 'hidden line' editor and can be used to remove line segments that are partly obscured. Select the line as above, then select an end with SPACE and RETURN. The line can then be moved with the cursor keys. RETURN will fix it at its new position and SPACE will restore the original line. When not rubber-banding, various other 'macro' facilities are provided. F4 mirrors the image about the vertical axis.

The rest of the functions are selected by holding down SHIFT and one of the following: cursor keys, move the whole image around the screen. Key z rotates the image anti-clockwise. (This and F4 allow vertical mirroring). F7 and F8 shrink and enlarge the image. Used in conjunction with the point editor, this allows finer control over the position of points. F3 and F4 shrink and enlarge about the x-axis and F5 and F6 about the y-axis.

Pressing ESCAPE will exit from any function of the editor leaving the current file and image intact. To exit the program press TAB. There are two ways to save a completed picture: If it is to be continued after saving, press F0 and enter a name. You can then continue editing by pressing 1. 2 or 3 can be used to load in another file. To save an image or delete it and start a new one, press TAB followed by Y to delete it or N to keep it. If it is deleted, it is removed from the screen, but any previously loaded images are left intact. Pressing 1 now will begin a new image. DELETE will remove all screen images and the current file, so use this with care!

To produce a composite picture, draw or load each of the components and move, scale and rotate them into the correct positions on the screen before saving them separately. Then run the additional program Convert. This will ask for a screen mode and then prompt for the various file names to include in the picture. Pressing RETURN by itself will prompt for a filename to save the completed picture. These pictures can then be loaded into any suitable painting program. The easiest way to load Super Plot files into a program of your own, for example a plotter driver, is to include a copy of PROCload from the editor.

One point of interest in the code is the rotate routine. This seemingly very tricky procedure is performed by a few lines of 6502 code. This is how it works: The new co-ordinates are calculated using the existing co-ordinates and the angle of rotation, a:

$$X' = X \cos a - Y \sin a$$
  
 $Y' = Y \cos a - X \sin a$ 

The sines and cosines are calculated using their Taylor expansions and a is taken to be 1/16,  $\cos a$  is then 1-1/512 and  $\sin a$  is 1/16. The formulae for the rotation are therefore:

$$X' = (X - X/512) - Y/16$$
  
 $Y' = (Y - Y/512) + X/16$ 

and all the division can be achieved by using simple LSRs. A very neat solution.

You should be able to see from the pictures on these pages that SuperPlot is a highly versatile program which could be used to create cartoon strips, decorative borders or title pages. Of course, what you could really do with now is a quick and simple to use painting program, so how about Jonathan's own Super Painter pro-



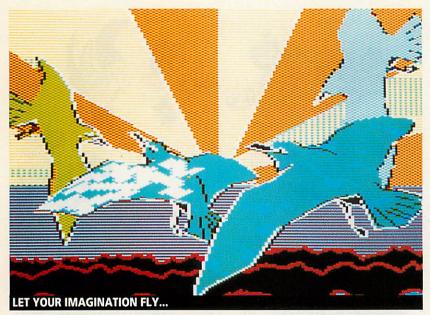
'Super Plot and Super Painter make ideal partners. With an eight-bit machine and a small amount of imagination, some impressive results can be obtained'

gram from BBC Acorn User, January 86?

#### SUPER PAINTER

With Super Painter, Jonathan took the bones of Rob Fenton's mode 2 painting program, Paintbox (February 85), converted it to Mode 1 and included Peter Sandford's colour fill routines from January 85 (and Pieces of Eight, June 91). He also improved the circle drawing routine, included a procedure for drawing elliptical arcs and added extra functionality to the block copy routine to allow mirroring.

On running the program, you will be presented with a cursor in the middle of the screen, a status bar at the bottom and a selection of colour fills at the top. The cursor is moved with the cursor keys, and its speed can be controlled with - (slow), + (medium) and \* (fast). Alternatively, [ will slow it down and ] speed it up. The dots around the cursor indicate the resulting size of various of Super Painter's operations. For example, pressing F0 draws a rectangle between the dots and FI draws an ellipse. These can be made solid with F8 or dotted with F9. F7 reverts to outlines. The dots can be moved into relation to the cursor with A, Z, < and >. Other shapes can be drawn by rubber-banding. O toggles between this and the cursor. Press F to fix the line or S to start a new one. Single dots are placed with D. Fill the drawn shapes by pressing F3. To choose



a colour, press F5, position the cursor over the desired colour in the menu at the top of the screen and return to main screen by pressing SHIFT. Choosing one of the four 'solid' colours changes the drawing colour. If the colour leaks out of a shape, press ESCAPE as quick as you can! No automatic undo is provided although pressing SHIFT-F4 saves a work file which can be reloaded with SHIFT-FO. Named saving and loading is performed with SHIFT-S and SHIFT-L. SHIFT-F6 will clear the entire screen.

v and H toggle vertical and horizontal guide lines on and off, useful to ensure that shapes are in line. To copy a section of the screen, select the area with the cursor and 'size' dots and press the COPY key. Then move to the destination position and press DELETE. After selecting the area, M and N can be pressed to select left/right or up/down mirroring or both. The 'size' dots can also be used as an airbrush; pressing F4 will plot a random smattering of dots in the current colour within the area of the dots.

As mode 1 only has four colours available pressing C will allow you to select these four from the full range. Keys 0 to 3 cycle through the available physical colours for each logical colour; RETURN makes the choice. The final function, arc drawing, is quite complex. Pressing F6 will show a simple ellipse which can be moved with the cursor keys, rotated with CAPS LOCK and CTRL, and magnified and reduced with > and <. Its proportions can be altered using A and Z, SPACE will remove it and redraw it at the cross, and RETURN will fix it in place.

To draw an arc, press SHIFT, move the cursor around the ellipse using SPACE and select the start point with RETURN. Repeat the process for the end point. The only restriction is that the end point must be further clockwise than the start. Pressing F6 again will provide the original ellipse again - this is useful for drawing identical objects.

Jon deliberately made the program openended to allow it to be easily tailored for your own needs. Memory is a little tight on an unexpanded BBC, although many of the procedures could be shortened by joining lines and shortening variable names.

'Many users like the convenience of commands in sideways Rom or Ram, but don't have a clue how to write their own commands, so that they are available all the time'

As can be seen by some of the pictures on these pages, Super Plot and Super Painter make ideal partner. Of course, the Archimedes can do all this with Draw, giving many more facilities. However, with an eight-bit machine and a small amount of imagination, some impressive results can be produced.

#### DO-IT-YOURSELF ROM

During a recent chat with Rob Miller, he said that one of the most popular features in the magazine, during his time as technical editor, was my automatic sideways Rom generator, AutoROM. This appeared in BBC Acorn User March 88 and was designed to take the drudgery out of writing sideways Rom images. It was a useful feature because, many users like the convenience of commands in sideways Rom or Ram, but don't have a clue as to how to write their own commands, so that they are available

In essence, AutoROM is a mini-filing system, a bit like a Ram disc. Existing machine code utilities can be 'cached' by the Rom and stored in sideways Ram. If the Rom detects that you are trying to run one of the commands it has cached, it 'downloads' the utility and runs it itself rather than loading it in from disc. The code itself is about 1.5K long, leaving just under 14K free for the storage of utilities. Four inbuilt commands are provided for accessing the storage area of the Rom. When the Rom is first loaded, you must issue a \*CLEAR. This ensures that all the data tables used by the Rom are reset to sensible values and that the storage area contains no spurious data. A machine code utility can be stored in the Rom by typing \*CACHE followed by the filename of the utility. Assuming the file can be found and there is enough space left in the Rom, the file will be loaded in and copied into the storage area.

There are two ways to find out what commands have been cached. You can type \*DATA, which will list all the commands along with their load and execution address, lengths and positions within the Rom. The number of bytes left in the storage area is also shown. The other way is to type \*HELP AUTOROM. This gives the usual format help text describing the commands provided by AutoROM. Underneath this is a name-only list of the files cached. \*SCRAP removes files from the Rom. As mentioned above, \*CLEAR can be used to re-initialise the Rom, a bit like formatting it ready for use.

The source code for two star commands can be found on the yellow pages for you to try out the facilities of AutoROM. The first, \*CHECK, provides a very simple command that tells you if a word is a palindrome or not, while \*PHONE produces, well, run it and see ...

It is important to note that when you are using \*CACHE, files are first loaded into normal memory, so it is vital to ensure that this will not interfere with what you are currently doing. If a utility normally loads and runs at &0900, then it will do so when \*CACHEd. Using AutoROM, you can collect together all those often-used machine code utilities into a single customised toolkit Rom. The whole collection can then be saved as a Rom image using \*SRSAVE on a Master, or \*RSAVE or similar on a BBC.

# Lasephipeot

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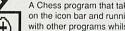


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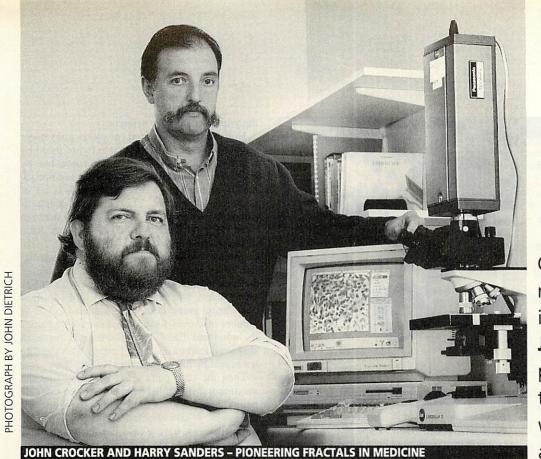
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Cellular shapes are not easy for scientists to categorise. JOHN CROCKER puts them under the microscope, with the help of an Archimedes

alking into the pathology department in a certain Birmingham hospital, you will find an Archimedes 440 hard at work on a rather unusual task. It is helping to assess the shapes and sizes of cancer cells.

The Archimedes was chosen by the group at East Birmingham Hospital, led by myself and Harry Sanders, for its powerful graphics and speed. These assets make it ideal for the study of microscopic images. The aim is to investigate the properties of cancer cells, but the study also helps to make an early diagnosis of surgical specimens, which can, in its turn, lead to an appropriate treatment.

There have been many studies that deal with the size of structures in cancer cells, but dealing with their shape is much more tricky. Conventional shape-measuring parameters, such as the form factor (an approximate measure of the 'roundness' of an object) are relatively crude. Furthermore, they tend to apply to grossly distorted forms and will not distinguish between, for instance, a thin cigar-shaped object and one with a star-shaped profile, like those shown in the diagram. This is a major problem, since in many areas, not only in the biomedical world, shapes tend to have irregular borders. Indeed, this is the case with the specimens in question and is where the Archimedes can help.

To get the images into the Archimedes, the investigators make use of a high-resolution, black-and-white video camera (mounted on a Leitz research microscope). The next stage is to transmit images to the Archimedes, via a Watford digitising board.

Alternatively, photographs are produced in an electron microscope and traced on a digitising pad, again linked to the Archimedes. Then it is over to two Archimedes packages.

The first is a program called *Digit*. It enables structures to be fully digitised and stored, either as video frames or digitised outlines. The next stage is to analyse this data. This is achieved

# OF LINES

with an excellent software package, called First. To overcome the problems of shape measurement, we have made use of fractal dimension analysis. This, of course, has a connection with chaos theory, a highly topical new branch of mathematics.

Fractal dimensions allow researchers to study shape accurately. They are used to obtain a measure of the regularity with which a curve fills a space. A point in space which is infinitely small has a dimension of zero, that is to say, it fills no space. A single straight line composed of an infinite number of points has a dimension of one and a plane, taken to be an infinite number of straight lines, has a dimension of two. A curve, composed of a number of straight lines, can be considered to have a value between one and two: it fills the space more than a line with dimension one but less than a complete plane with a dimension of two.

An estimate of the fractal dimension of a curve is made as follows: a series of estimates of the perimeter length of the curve is obtained using successive step sizes and then step sizes and perimeter measurements are normalised - a

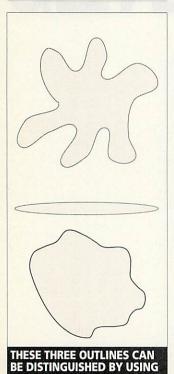
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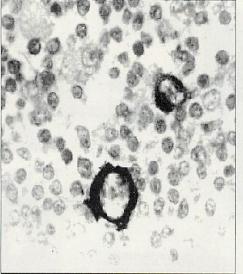
A cancer cell is a normal cell that has gone 'rogue', meaning that it replicates without limit, producing an, often malignant, tumour. Given their tendency to spread, early diagnosis of cancerous cells is vital.

It now looks as though there is a range of causative factors behind the single 'disease' we call cancer. The most well-known cause is chemicals - we've all seen the warnings on cigarette adverts. Also identified are hard radiation, viruses, and genetic time-bombs within the body's own cells - the so-called 'oncogenes'.

The causes all involve one vital function of the human cell - replication, or to give its full name, mitosis. One particular cell structure is vital to this - the nucleus, containing the genetic material DNA. In a healthy cell from a given area of the body, the nucleus will take the shape of an oval of a given aspect ratio.

Cancer cells give themselves away. If DNA mutation leading to cancer has taken place, the nucleus and its internal structures, including a small body known as the nucleolus, may appear distorted in shape. This distortion is not always obvious to the human eye, so computers like the Arc can make a vital contribution to saving lives.





#### CANCER CELLS IN NORMAL TISSUE

process we will look at in more detail later.

Step sizes and their respective perimeter measurements are plotted on a logarithmic graph with the former as the x-axis, and the slope of the plot is found. This resulting slope gives the fractal dimension. In fact, the slope of the plotted points is negative and indicates that part of the fractal dimension above one. Thus the true fractal dimension is the value of the slope multiplied by (-1, +1).

The fractal dimension can be calculated for a range of step sizes. In fact, different step sizes often produce different fractal dimensions. This is because they reveal different features of the curve under study. A curve with an irregular overall shape, but a generally smooth surface, is a typical case. It will have a large fractal dimension for a range of large step sizes. In other words, large steps will display the large features of the overall shape.

On the other hand, the fractal dimension for a range of small step sizes will be small. This is because small step sizes will display the generally smooth features of the surface. Conversely, a curve with a regular overall shape, but an irregular surface, will show a large fractal dimension for small step sizes and a smaller fractal dimension for large step sizes.

Perimeter length is also needed and a manual way to estimate the perimeter length is to set up pair of dividers to the step length and 'walk' the dividers along the curve. The number of steps multiplied by the step size gives the perimeter estimate. These measurements can then be plotted. The perimeter is needed for each step size. Before plotting, however, the step size and perimeter length must be 'normalised': this is done by dividing them by the maximum distance between any two points on the curve.

The step size and perimeter estimate are normalised in order to standardise the dimensions of the shapes and remove any effect on the results which could be attributed to the actual size of the shape. The slope of the plot can be found manually by deriving the optimally fitting straight line which passes through the plotted points. This line is extended to where it intersects the x and y-axes; the slope of the line and the fractal dimension are given by the ratio of the y-intersect and the x-intersect.

However, we adopted a more convenient method. The perimeter estimate is not made by summing equal steps along the curve but by laying a set of imaginary, equally-spaced horizontal lines over the shape. This yields a set of points on the curve. The perimeter length is calculated by finding the distances between these points and the procedure is repeated for a different spacing of the lines.

The method is equally valid since the calculation of a fractal dimension calls for an unbiased method, in other words one that is unaffected by curve shape. The data obtained is in the form of co-ordinate pairs, describing a closed curve. A number of curves for each patient are contained in individual files. The co-ordinates for each shape are read into a pair of arrays with the data teminated by the co-ordinates, (-999, -999).

Then the data pairs are scanned to find the maximum distance between any two co-ordinate points and also to find the maximum and minimum y co-ordinates. When two of the original points have y co-ordinates which differ by more than 1, the intermediate points, with successive integer co-ordinates, are calculated. These are put into to the new arrays.

After this process, the new set of co-ordinates will contain successive y co-ordinates which differ by zero or one, starting with the smallest y co-ordinate. This is then used to calculate the perimeter estimate. Different step sizes are determined by taking separations of y-axis points. The smallest step size possible is one. In this case, all data points in the new data array pair are used.

The perimeter estimate is the total of distances between each point. The next possible step size is two (since all y co-ordinates in the new set of co-ordinates are integers). So the perimeter estimate is derived by summing the distance between every second y co-ordinate. Where successive y co-ordinates are equal, and the first point is included, then all successive points with the same y co-ordinate are used.

Where the step size is three, every third y coordinate is used, and so on. The first point is always used at the end of the series of points to close the curve, so that the perimeter estimate is always calculated from a set of points which start and end at the same point. Once the step sizes and perimeter estimates are normalised their logarithms are calculated. As each pair of logarithms is calculated, an estimate of the slope of the line joining the points is calculated by regression analysis. This gives the basis for the fractal dimension of each curve.

The fractal dimensions of a number of curves are calculated for each patient and their mean is worked out. It is then possible to relate these values to other parameters which may also be used in diagnosis or patient care.

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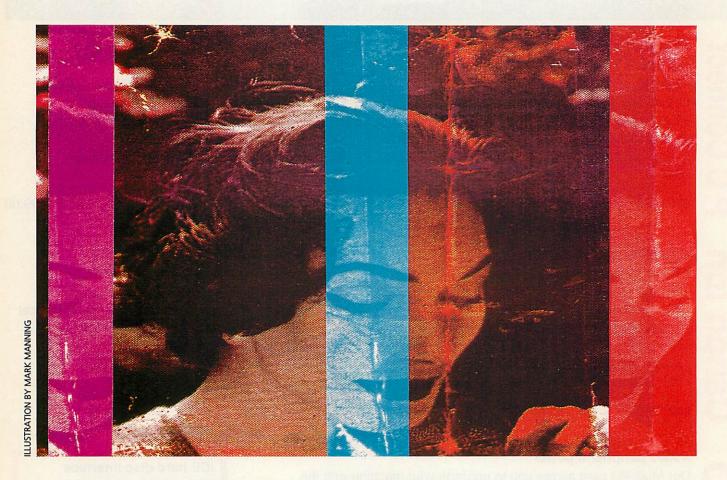
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# MODUS OPERANDI

#### IAN WILSON

offers a program that will help you to fine-tune your Archimedes sprites

ave you ever created a good sprite on your Archimedes or A3000 and then wished you had started in a different screen mode, or used non-desktop colours? Or changed your mind about the dimensions of the sprite when actually putting it to use? Paint is a first class sprite editor, but lacks the facility to alter the mode of a sprite or its size. My program, SprEd, in this month's yellow pages, has been written to complement Paint and enable you to fine-tune your Archimedes artistry.

Type in listing one (or load it from the monthly disc), debug and run it to create the application directory SprEd within the currently selected directory. Next, type in the second listing, debug it and save it as RunImage into the SprEd directory. To load SprEd, double click on its icon and it will appear on the right hand side of the bar. You can now start editing sprites.

Load a sprite file by dragging its icon to the icon bar and SprEd's main window will open. The editing window is divided into two sections: on the left are details of the sprites in a file as they already exist, while on the right are details of the new sprite to be produced for each of the originals. Use the arrow icons to scroll to the sprite that needs editing, then editing operations can be performed on the right side of the window. Enter the new mode number from the keyboard (click on the mode number icon to gain the caret) and adjust the sprite's dimensions using the arrow buttons. The new sprite will be created when its icon is dragged to a directory viewer or sprite file window.

If it has a valid pathname, you may click on the OK box. To save several sprites as a single file it is best to drag them to a Paint sprite file window which can then be saved as one. Large sprites may take several minutes to copy.

Changing the mode of a sprite does not in itself alter its size in pixels, but may alter its physical size on the screen. For example, a mode 13 sprite made from a mode 14 original will have double the width of the original because mode 13 has bigger pixels. To compensate for this you may give the new sprite half the width of the original.

Further options are available from the menu within the main window. By default a sprite's desktop colours are copied to the desktop colours of the new mode, but permutations of desktop and actual colours are allowed. For example, if you select 'desktop to actual', a sprite originally designed for the desktop may be used outside the desktop in the 'native' screen mode. Where a native mode has flashing

colours, only the first colour of a flashing pair is used. If a sprite has its own palette, this palette may be copied to the new sprite if the new mode has the same number of bits per pixel (in fact, this is the default option). It is not always be possible to copy a sprite exactly in a new screen mode as the sprite's colours may not be available in the new mode. SprEd finds the best approximation to each colour for the new mode.

The program uses the ColourTrans module which is loaded from the System directory. A sprite created by SprEd is copied, pixel by pixel, from its original, and each colour number in the new mode compared with the original in a translation table at address Palette%. SWI ColourTrans\_SelectTable creates this table, given the incoming and outgoing modes and palettes. Unfortunately, this gives insufficiently accurate results when 256 colour modes are used, so palette entries are calculated from colour numbers and vice versa in PROCinvert and PROCconvert. The default desktop palette for each mode is loaded into the address Table%. Other palettes are available either as 'default for mode' or the sprite's own palette.

When a sprite file is loaded into SprEd it claims enough memory from the free pool using the SWI Wimp\_Slotsize (this memory may be reclaimed by clicking Clear on the icon bar menu) and any new sprite is created in another chunk of memory from the free pool, which is then released when the sprite has been saved.

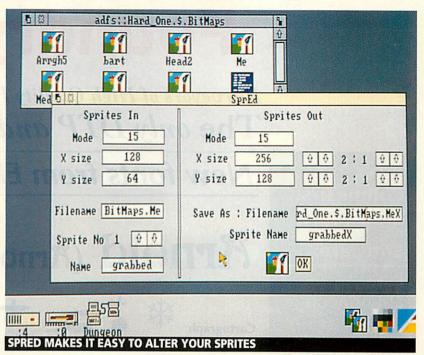
Sprites are transferred to and from other tasks by direct memory transfer or, if the external task does not support this, a scrapfile is used.

The Archimedes series has a good choice of screen modes and even with a standard colour monitor, 16 modes suitable for displaying sprites are instantly available. These graphics modes differ from each other in the physical size of each pixel and the number of bits of memory required to represent each pixel, and hence the number of available colours. In colour modes 2, 4 and 16 the actual colours used may be altered from the default colours by substituting 'logical' colours, although no greater number of colours is available at any one time. In the case of 16 colour modes there are eight steady colours and eight flashing colours - this provides backward compatibility with the eight-bit BBC micros.

The Risc OS desktop adds a new dimension to the story. There are 16 colours available, all of which may be defined by the user - and there are no flashing colours. The desktop will display the best approximation available from its palette to any colour of a sprite and, if the desktop is used in modes of two or four colours, ECF (Extended Colour Fill) patterns are used to increase the number of colours apparently available. If you leave the desktop without issuing a mode change instruction, the desktop palette is still available to you but, once you change mode, the palette is as described above.

Making the situation yet more complicated is the behaviour of the 256-colour modes - these are the same inside or outside the desktop.

A sprite is an area of the screen saved into memory. Its data includes its size in pixels in x and y dimensions and the screen mode in which the sprite was created - hence the number of bits per pixel in the sprite map. Therefore, although



it is perfectly possible to display a sprite in a mode other than that in which it was created, its appearance may not be as it was intended.

A sprite may also have its own palette which is stored as a translation table in the sprite header. Such a sprite will, as before, be displayed on the desktop in the best approximation to its own colours using the available palette. However, in native mode it is displayed simply according to the colour numbers used.

A palette entry is a word in memory of the form &BBGGRR00 where the three most significant bytes give the amount of red, green and blue respectively. In fact only the first nibble of each byte is used by the present hardware so that &BXGYRZ00 will give the same colour as &BUGVRW00. The Programmer's Reference Manual advises that you make both nibbles of each byte the same to maintain upward compatibility, but I have found no examples of software that have actually done this. So it follows that there is a total of 4096 colours, since there can be 16 levels of each primary in any mixture.

In 256-colour modes there are only 64 colour numbers and each one is defined in binary as %PC%BbGgRr and the total number of colours is extended to the maximum by four possible levels of 'tint'. So it is quite easy to calculate the nearest possible 256-colour mode colour to a palette entry and easier still to calculate a palette entry given a colour number and tint value.

VDU 19 provides several options for defining the palette of your screen mode. This call enables definition of each logical colour as a physical colour or to create a palette in terms of red, green and blue components.

You can try displaying a few sprites in various modes inside and outside the desktop, and use the program to make families of sprites in different modes and palettes. This description is by no means an exclusive account of the way colours are handled, but it is intended to illustrate the diversity of choice available to you and should whet your appetite for this fascinating and very complex aspect of your computer.

'This program should whet your appetite for this fascinating and very complex aspect of your computer'

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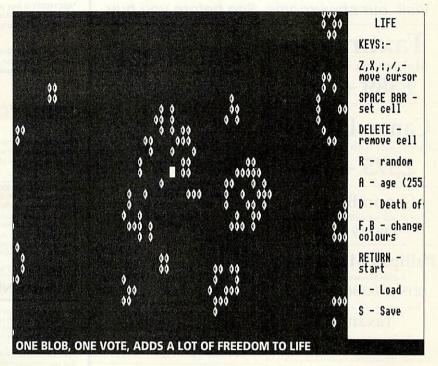
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n the May 90 issue of BAU, Phil Bender presented a version of Life that was considerably faster than previous versions for the BBC. The algorithm used counts votes cast by cells rather than counting cells themselves and fairly zooms ahead. On average, 15 generations can be displayed every second. However, Phil left his program hanging in the air slightly by having no way to save and load patterns.

Conventional Life programs scan through an array of cells checking the number of neighbours each cell has. If a dead cell has three neighbours, a new cell is born. If a live cell has less than two or more than three neighbours, it dies, from loneliness or overcrowding.

A dead cell in this generation can have no effect on the next generation. So, consider an array of cells, and an array of votes cast by cells. First, clear the votes array. Then, each live cell casts a vote for each of its neighbouring cells by incrementing the appropriate locations in the votes array. A cell also votes for itself.

When all the cells have voted, the votes array is scanned. If a cell has four votes, it is either a live cell with three neighbours or a dead cell with four neighbours. In both cases, no change is required, so its vote is cleared and it is skipped. If a cell has three votes, it is either a live cell with two neighbours or a dead cell with three neighbours, so its vote is cleared and if it is not already alive, it is marked as live and printed. In all other cases, the cell must die, so it is killed and removed from the display.

Using this algorithm makes the speed dependent only on the number of cells that change state each generation.

An extra feature added is that cells can die from old age. When each cell is created, either at the editing stage or at a birth, it is born at the age stored in &AFF. The value stored is 256 minus the maximum age a cell can get to.

Just when you think you've sampled all that Life has to offer, along comes another version.

#### **JONATHAN HARSTON**

shows off his high-velocity masterpiece

During each scan of the cells array, the flag at &AFE is checked. If bit seven is set, and the current cell is alive, its age is incremented. If it gets to zero, then it has died, and it is removed from the screen. There is also a check to change the shape of the cell on screen 10 generations before it would die.

Enter and save listing 1. When run, this generates the machine code which is used by the main program. Now enter and save listing 2. This is the Basic control program used to edit and load and save the patterns. The program as listed is quite compressed - most of the variable and procedure names are single letters to save space. Also, don't put any spaces between the line numbers and the actual lines.

When run, you get the list of options down the left-hand side. The new options are the save and load options and death by old age. You can also clear the screen by pressing C, and enter a star command by pressing \*. As an alternative to using the z, x, : and ? keys for editing, the program will also recognise the cursor keys and TAB does the same as DELETE. When quitting from running Life, the pattern stays on the screen so you can edit or save it. To finish, press ESCAPE from the editing menu.

Now, it's time to try entering some patterns. Enter a line of five cells. Move down a row and put one cell under the left-hand end. Now move down another row and put one under the righthand end. When this pattern is run with old age turned off, it sends colonies of cells swirling around the screen, and stabilises after about 1200 generations. If you turn old age on, though, (indicated by the menu option saying 'D - Death off') it stabilises after about 700 generations, and then dies completely. There are probably patterns that would die out without old age and continue regenerating with old age. The challenge is to find them!

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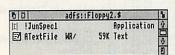
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eography is not generally thought of as a prime target for computer power. And as if to back up this misconception, the geography orders in the National Curriculum reveal only limited computer involvement. The suggestions made in both the orders and the non-statutory guidelines fall a long way short of what is actually possible.

This article aims to correct this by giving you some ideas - there is a lot of potential for using computers in the geography classroom, in ways that can contribute to both the subject itself and the technological expertise of the pupils.

The few examples given in the non-statutory guidelines include creating questionnaires, using databases to search for geographical patterns and comparing the seasonal differences of temperature and rainfall. Within the orders, examples are given of more specialised computer use, such as satellite images and geographical information systems (GIS). Therefore IT in geography can be defined as the use of:

- Wordprocessors for drafting and editing work for displays and booklets
- Desktop publishing for presentation
- Databases to analyse sources, form and test hypotheses and relate results of enquiries to other sources
- Simulations to interpret evidence and study the causes of events
- Monitoring and measuring software to capture, store and manipulate weather data

#### VISUAL AIDS

Multimedia, clip art and resource packs are becoming more common, and typically comprise discs of sprite or draw files for inclusion in children's presentations. The Acorn Educational Directory is a good place to start looking for material and it is available from your local Acorn dealer. One obvious example is to use maps and we found two good sources. The first is Panorama, from David Pilling Software (this has recently replaced Worldmap and The World Digitised). It will enable you to produce a map of any part of the world, colour it in Draw and load it into another program. Other maps in draw file format are available: the World Geography Maps pack is of a very high quality.

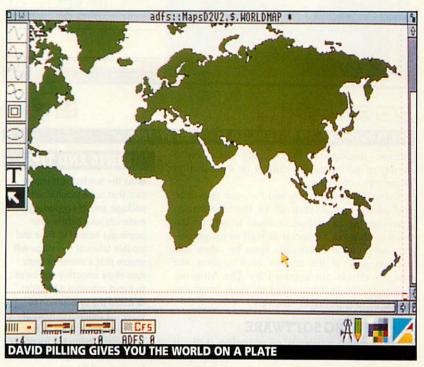
Multi-lingual typefaces can also find a place in geography courses and a good starting point is the Electronic Font Foundry, which produces Indic, Hebrew, Cyrillic and Greek fonts.

Information handling comprises a major aspect of computer use within the National Curriculum generally and Key Plus 2, with its integrated mapping system, will allow you to use data files with locational information. It can be used with Key Plus by plotting data onto the maps and printing them out: this is very useful for key stages 2 to 4.

#### MODELLING

Content-based software comes in the form of simulations. In other words it aims to provide a realistic backdrop to geography lessons by giving the pupils a 'real-life' complex situation. The degree to which the simulation is used is up to the teacher. It can be the focus of a topic with supporting resources, or it may be one of a number of activities on a common theme. For a

# TOP OF THE WORLD



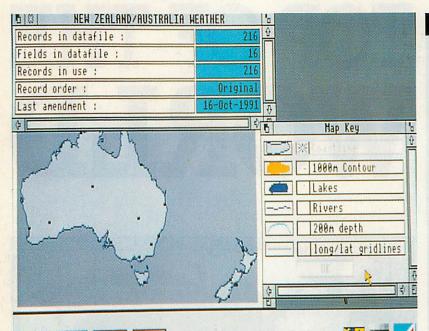
With the National Curriculum now in full swing, CHRIS **DRAGE** looks at the ways in which computers can help geography teachers

general program, versatile Touch Explorer Plus can provide a framework for all manner of geographical explorations.

Rainbow River is more specialised: children must balance the waste going into a reservoir against the water taken from it. This is a valuable addition to the theme of conservation, rivers and the water cycle and is suitable for use at key stage 3. A title based on a similar theme is The Water Game which simulates managing a sparse water supply. There is just enough factors involved to make the game interesting and challenging, despite the rather crude graphics.

Flight Path simulates plotting the course of an airliner and Search and Rescue involves planning the rescue of a stranded yacht. Both programs deal with geographical location and variables such as fuelling the craft, mapping the proposed route, and taking the various climatic conditions into account.

A variety of simulations fit into the general humanities/geography area. The Sea and Roads are two packages which introduce the problems of planning, decision-making and management for pupils at key stages 2 and 3. The Bypass, part of the Roads package, simulates the need to create a bypass around a town whose roads have



#### PLUS OFFERS AN INTEGRATED MAPPING SYSTEM

become inadequate. Pupils may draw on a variety of information including an examination of the types of traffic.

Using this information and the map provided, and taking into account all of the information given on the worksheet, a route to bypass the town is planned. Financial as well as geographical and political constraints must be taken into account and, at the end of each session, the group's efforts are assessed by The Minister. Arguably, the best feature of all these programs is that there is no 'right' answer.

#### SUPPORTING SOFTWARE

With so much emphasis on mapping skills, it makes sense to use computer mapping programs, as they tend to offer more interaction than atlases and can be very motivating.

General Map Reading and Coastal Map Reading apply the principles common to many map programs to Ordnance Survey maps. Interpreting symbols, orientation and compass readings, plus eastings and northings, forms part of these packs. Similar packages include Introducing Map Skills 1 & 2, Maps and Landscapes and Geomapping. The latter converts contour maps into 3D landscapes which can be rotated and viewed from different directions - a valuable resource for key stages 3 and 4.

By using colourful animated graphics Mapventure helps key stage 2 pupils to understand what maps are representing. Using four compass point views, the children navigate their way around an environment, in the context of an adventure. This concept is taken even further in Viewpoints where 'photos' can be taken and a database created from their findings.

Finding software suitable for younger children is always a problem. Two such programs are Shops and Supermarkets and Camping - for children with a reading age of at least a sevenyear-old. Year three pupils can attempt the tasks quite independently. In Shops and Supermarkets, which uses a Concept Keyboard, children

#### HINTS AND TIPS

- As the teacher, it is important that to be familiar with a package and its supporting materials long before your pupils get hold of it. Time and trouble taken at this stage will ensure that a theme or topic runs more smoothly and helps to avoid potential difficulties.
- Avoid the compulsion to place the children in front of the micro too quickly. A few days spent laying the foundations for the study and building on the children's background knowledge will be time well spent.
- Although it has been stated many times before, work away from the computer cannot be emphasised enough. The children will be willing to research, write, illustrate and build, as a result of the excitement that has been generated by the computer.
- General computer software - wordprocessors, desktop publishers, hypermedia and text revelation programs can also be used to help geography studies. We listed a range of these in the November 91 issue, on page 84 in our table entitled Information Handling.

#### PRODUCT DETAILS

- Panorama, disc number 33, £5.99, for the Archimedes range, from David Pilling Software on (0253)
- World Geography Maps, £25.50, for the Archimedes, from Micro Studio Ltd on (0353) 720433.
- For a free disc catalogue and price list of its available fonts contact Electronic Font Foundry on (0344)
- Key Plus 2, from ITV Association on 071-247 5206. Prices from £65, depending on the size of the school.
- Touch Explorer Plus, £17.50, for the BBC B, B+ and Master 128, from Microelectronics Education Support Unit. For more details contact NCET on (0203) 416994.
- Rainbow River, for the BBC range, from Cambridge University Press on (0223) 358331.
- The Water Game is available from the Centre for World Development, Regent's College, Inner Circle, Regent's Park, London NW1 4NS.
- Flight Path and Search and Rescue, £25.52 for the BBC range and £28.51 for the Archimedes range, from Storm Software on (0963) 22469.
- The Sea and Roads are available from Fernleaf on (0474) 359037.
- General Map Reading, Coastal Map Reading and Geomapping, £27 each, for the BBC B and Master, from Soft Teach Educational on (0985) 40329.
- Introducing Map Skills 1 & 2, £27 each, for the BBC, from AVP on (0291) 625439.
- Maps and Landscapes 1 & 2, £22, for the BBC and A3000, from Chalksoft on (0775) 769518.
- Viewpoints, £35, for the Archimedes range, and Mapventure, £25, for the BBC and Archimedes. Contact Sherston Software on (0666) 840433.
- Shops and Supermarket, £14 for the BBC and £16 for the Compact, and Camping, £14 for the BBC, £16 for the Compact and £16 for the Archimedes. For more information contact Northern Micromedia on (091) 2700424.
- The Dudley Programs are from Heinneman Education, 22 Bedford Square, London WC1B.
- Designer Environment is available from Data Designs, Business and Innovation Centre, Innovation Way, Barnsley, S75 1JL. Prices start at £19.95 for the BBC plus £24.95 for the printware Rom, and £60 for the Archimedes.

(All prices are excluding VAT)

practise their shopping skills. Camping simulates a weekend camping trip which must be carried out successfully and safely. The most impressive feature of both these packages is the range of photocopiable support materials and the ideas presented.

The ageing but worthy Dudley Programs consist of six theme packs - Travel, Homes, Myself, Weather, Food and Exploration - and form a coherent resource base for project work.

Lastly, using Designer Environment, the computer can provide a link with design and technology. An environment, complete with telephone boxes, churches and mosque can be designed by pupils on-screen. The pieces are then printed out, complete with glueing tabs and a map to position them on. This is a useful program that allows children to reconstruct their local area and to identify problems and even make improvements. For a more complete description of this series, see the September 91 issue of BAU.

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|               |           | B+    | 128 | 128       | Compact      |             | Turbo   |      |        | Ram                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | A3000/A5000 | disc    |
| ★Info         | 57        |       |     | The guest | <b>H</b> 355 |             |         |      |        | PER DESIGNATION OF THE PERSON |             |         |
| Info 1-2      |           |       |     |           |              |             |         |      |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |         |
| Info 3-4      |           |       |     |           |              |             |         |      |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |         |
| Info 5        | MAINT     |       |     |           |              |             |         |      |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |         |
| Info 6        |           |       |     |           | C. Balance   |             |         |      |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |         |
| Info 7        |           |       |     |           |              |             |         |      |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |         |
| Info 8        |           |       |     |           |              |             | TO THE  |      |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |         |
| Pieces of 8   | 71        |       |     |           |              | Telegraph ( |         |      |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |         |
| Po81-4        |           |       |     |           |              |             |         |      |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |         |
| Po85          | THE PARTY |       |     |           |              |             |         |      |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |         |
| Po86          |           |       |     |           |              |             |         |      |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |         |
| Po87          |           |       |     |           |              |             |         |      |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |         |
| Sprite Editor | 80        |       |     |           |              |             |         |      |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             | -       |
| Life          | 83        |       |     |           |              |             |         |      |        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |         |

\*Info

```
770 JSR oswrch
780 INY
790 CPY #8
800 BNE loop
810 LDA #224
820 JSR oswrch
830 PLA
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        310 osword=&FFF1
Listing 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1130 SEC
1140 SEC &80
1150 SEC left%,X
1160 STA width%,X
1170 DEC word%
1180 BNE buildloop
 10 REM >ThinText (Infol)
20 REM by Martyn Ayshford
30 REM for all 8 bit machines
40 REM (c) BAU January 1992
50:
60 DIM code $2000
70 PROCassemble
80 FOR mode:0 TO 2
90 MODE mode
100 width-80/(2'mode)
110 PRINTTAB((width-17/2)/2,0);FNthin("Thin text routine")
120 FOR col=0 TO 15
130 COLOUR col MOD 8
140 PRINTTAB((width-20)*((col MOD 8)-4);(width-22/2)/2,col+2);FNthin("Printed in any colour.")
150 NEXT
160 IF mode<> 2 mcET
170 NEXT
160 IF mode<> 2 mcET
170 NEXT
180 RND
190 :
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          330 FOR pass%=0 TO 2 STEP 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   334 Pk=code%
350 [OPT pass%
350 [OPT pass%
360 .length
370 LDY #0
380 STY &70
390 STY &70
390 STY &71
400 .findlength
410 LDX word%, Y
420 CPX #32
430 BCC foundlength
440 LDA width%, X
450 CLC
460 ADC &70
470 STA &70
480 BCC nh
490 INC &71
500 .nh
510 INY
520 BNE findlength
530 .foundlength
530 .foundlength
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          340 P%=code%
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1170 DEC word%
1180 BNE buildloop
1190 RTS
1200:
1210 :findlimit
1210 STA findlimitloop2+1
1230 LDY #8
1240 STY &80
1250 .findlimitloop1
1260 LDX #1
1270 LDA word%, Y
1280 .findlimitloop2
1290 INX
1300 ASL A \ modified
1310 BEQ foundlimit
1320 BCC findlimitloop2
1330 TXA
1340 SBC #2
1350 TAX
1360 .foundlimit
1370 CPX &80
1380 BCS xnotless
1370 CPX &80
1380 BCS xnotless
1390 STX &80
1400 .xnotless
1410 DEY
1420 ENE findlimitloop1
1430 LDX word%
                                                                                                                                                                                                                                                                                                                            830 PLA
                                                                                                                                                                                                                                                                                                                            840 TAX
850 JMP control
                                                                                                                                                                                                                                                                                                                   850 JMP control
860 .end
870 RTS
880 .set
890 LDA #32
900 STA charl
910 INX
920 LDA #13
930 STA string,X
940 DEX
950 JMP return
960 .roll
970 LDA byte
980 ADC shiftl
990 STA byte
1000 JMP reti
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     520 BNE findlengt
530 ,foundlength
540 RTS
550 :
550 :
550 .prop
570 LDY #0
580 .showprop
590 LDX word$,Y
600 CPX 32
610 BCC shown
620 LDA left$,X
630 CLC
640 ADC #1
650 JSR move
                                                                                                                                                                                                                                                                                                                     1010 .once
1020 AND #85
1030 STA temp
1040 LDX #4
              190 :
200 DEF FNthin($string)
              210 CALL thin
220 =""
                                                                                                                                                                                                                                                                                                                1046 LDX W4
1050 .back
1050 .back
1060 LDA temp
1070 AND shift2
1080 BNE rol1
1090 ASL shift1
1110 ASL shift2
1120 ASL shift2
1130 DEX
1140 BNE back
1150 RTS
1160 .string
1170 ]
1180 NEXT
              240 DEF PROCassemble
          240 DEF PROCassemble
250 charl=670
260 char2=679
270 byte=682
280 shift1=83
290 shift2=684
300 temp=885
310 osword=8FFFE
320 osword=8FFFE
320 osword=8FFFE
330 FOR pass=0 TO 2 STEP 2
340 P%=code
356 .thin
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1430 LDX word%
1440 LDA &80
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1450 RTS
1460 ]
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     650 JSR move
660 LDA word%,Y
670 JSR oswrch
680 LDA right%,X
690 JSR move
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                1470 NEXT pass%
1480 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          670 JSR oswrch
680 LDA Pight*, X
690 JSR move
700 JSR move
700 JSR move
710 BNE showprop
712 .shown
713 RTS
740:
750 .move
750 ASL A
780 STA &82
790 LDA #4
800 SEC
810 SBC &82
820 STA &82
830 LDA #0
850 PHA
860 LDA #25
870 JSR oswrch
880 LDA #25
870 JSR oswrch
900 LDA &82
911 JSR oswrch
900 LDA &80
900 LDA &80
900 LDA &80
910 JSR oswrch
910 JSR oswrch
910 JSR oswrch
910 JSR oswrch
910 LDA #0
911 LDX #word* MOD 256
910 LDA #0
910 LDA #0
910 LDA #0
910 LDA #0
911 LDX #word* MOD 256
910 JSR osword
910 LDA #0
910 JSR findlimit
110 STA right*, X
110 JSR findlimit
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         Listing 3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        10 REM >BlindFlies (Info3)
20 REM By Barry Wickett
30 REM For Archimedes only
40 REM (C) BAU January 1992
50:
60 MODE 12:MODE 8:OFF
70 ON REROR PROCEPTOR
80 PROCINIT:PROCFILES
90 REM
              360 .thin
370 LDX #0
     388 .control
398 LDA string, X
400 CMP #32
410 BCC end
420 STA char2
430 INX
440 LDA string, X
450 CMP #32
446 BCC set
470 STA char1
480 .return
480 .return
480 .return
500 TXA
510 PRA
520 LDA #10
530 LDX #char1 DIV 256
540 LDY #char1 DIV 256
550 LDX #char2 DIV 256
550 LDX #char2 DIV 256
560 LDX #char2 DIV 256
570 LDY #char2 DIV 256
680 STA soword
590 LDA #33
600 JSR osword
610 LDA #224
620 JSR osword
610 LDA #224
620 JSR osword
630 LDY #6
640 LODA #31
650 STA shift2
700 LDA #1
680 STA shift2
700 LDA #1
671 LDA #1
672 TA shift2
740 LDA #1
750 JSR once
760 LDA byte
                                                                                                                                                                                                                                                                                                          Listing 2
                                                                                                                                                                                                                                                                                                                        10 REM >PropText (Info2)
20 REM Proportionally spaced text
30 REM by Dave Acton
40 REM for all 8 bit machines
50 REM (c) EAU January 1992
60:
70 MODE 4
80 VDU 19,0,1,0,0,0
90 PROCass
100 CALL buildtable
110 VDU 5
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  80 PROCINIT:PROCITIES
90 END
100:
110 DEF PROCETOR
110 DEF PROCETOR
120 IF ERR=17 MODE 0:END
130 SYS*OS Byte*,112,3-screen
140 SYS*OS Byte*,112,3-screen
140 SYS*OS Byte*,113,3-screen
150 PRINTREPORTS;* at line *;FRL
160 END
170:
180 DEF PROCINIT
190 COLOUR 2,4*ORIGIN 640,512
200 goodies=3:baddies=1
210 size=32:speed=8
220 flies=goodies+baddies
230 DIM sx(flies),sy(flies),an(flies),
hx(flies),hy(flies)
240 DIM sacrah(flies),honk(flies)
250 min=10:max=200:honk=max
260 FOR fly=1*NO flies
270 sx(fly)=RND(80)-400
290 sy(fly)=RND(80)-400
290 sy(fly)=RND(360)-1
300 search(fly)=PALSE
310 honk(fly)=honk
320 IF fly=goodies honk=honk/2
330 NEXT fly
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              9Ø END
                                                                                                                                                                                                                                                                                                                        120 PROCprop(4, "This is an example of"
                                                                                                                                                                                                                                                                                                                       130 PROCprop(7, "proportionally spaced
                                                                                                                                                                                                                                                                                                     130 PROCEPTOP(13, "As you can see, many more than 40 columns")
150 PROCEPTOP(16, "can be squeezed onto a 40 column screen.")
160 PROCEPTOP(22, "(It looks prettier to
                                                                                                                                                                                                                                                                                                     160 PROCProp(22,"(It looks prettier to o!)")
170 VDU 4
180 END
190:
200 DEF PROCProp(ypos%,t$)
210 $word%=t$
220 CALL length
230 NOVE 640-(7270+256*7271)*2,1023-32
*Vpos%
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     320 IF fly=goodies honk=honk/2
330 NEXT fly
340 screen=1
350 ENDPROC
                                                                                                                                                                                                                                                                                                              'ypos%
240 CALL prop
250 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       360
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 360 :
370 DEF PROCFLIES
380 REPEAT
390 SYS "OS_Byte",113,screen
400 WALT
410 screen=3-screen
420 SYS "OS_Byte",112,screen
                                                                                                                                                                                                                                                                                                                     250 andreco.
260 :
270 DEF PROCASS
280 DIM code% £100
290 DIM left% £100,right% £100
300 DIM width% £100,word% £100
```

1110 STA right%, X 1120 LDA #9

```
4 430 CLS
440 FOR fly=1 TO flies
450 IF search(fly) THEN
450 dx=hx(fly) =sy(fly)
470 dy=hy(fly)=sy(fly)
470 dy=hy(fly)=sy(fly)
480 IF dx=0 ang=90*SGN(dy) ELSE ang=DE
GATN(dy/dx)+(dx<0)*180
490 ang=FNnorm(FNnorm(ang)=an(fly))/10
500 an(fly)=son(dx*dx*dy*dy)/2
520 IF honk(fly)=max honk(fly)=max
530 IF honk(fly) max honk(fly)=min
540 ENDIF
550 an(fly)=FNnorm(an(fly))
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         2300 DEF PNxlate(bytes%)
2310 LOCAL I%
2320 FOR I%=1 TO bytes%
2330 [OPT pass%
2340 LORB r3,[r0]
                                                                                                                                                                              450 PROCprint("Graininess (1 - 100) :"
                                                                                                                                                                                                                                                                                                                                                  1370 lft%=FNrand((t_lft%+b_lft%)/2,len_
                                                                                                                                                                               460 PROCorint("Drawing width (Acorn un
                                                                                                                                                                                                                                                                                                                                                 1390 IF y%=0 THEN
1400 top%=FNrand((t_lft%+t_ryt%)/2,len_
                                                                                                                                                                                s) :",0,14)
470 PROCprint("Drawing depth (Acorn un
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          2350 LDRB
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           r3, [r2,r3]
r3, [r0],#1
                                                                                                                                                                               480 PROCprint("Point width (pixels) :"
                                                                                                                                                                                                                                                                                                                                                 1410 ELSE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          236Ø STRB
                                                                                                                                                                                                                                                                                                                                                  1420 top%=save%!((x_ryt%*ypoints%+y_top
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          238Ø NEXT
                                                                                                                                                                                490 PROCprint("Point depth (pixels) :"
                                                                                                                                                                                                                                                                                                                                              %)*4)
1430 ENDIF
                                                                                                                                                                     490 FROCprint("Point depth (pixels):",7,20)
500 FROCprint("By Phil Le Sueur (1991)
",7,28)
510 COLOURGCO1%(0) TINT tint%(0)
520 INPUTTAB(30,12):%
530 FF 1%-1 AND 1%-100 grain%-1% ELS
E PRINTTAB(30,12); grain%
540 INPUTTAB(30,14):%
550 IF 1%-256 AND 1%-1280 xw%-1% AND
RFFFFFFF ELSE FRINTTAB(30,14):xw%
556 INPUTAB(30,610)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          2390 =pass%
2400 :
                                                                                                                                                                                                                                                                                                                                                   1440 lft%=save%!((x_lft%*ypoints%+y_bot
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         2400 :
2410 DEF FNscreenadr
2420 temp%!0=148:temp%!4=-1
2430 SYS*OS_ReadVduVariables*,temp%,tem
                                                                                                                                                                                                                                                                                                                                              1450 ENDIF
1460 ryt%=FNrand((t_ryt%+b_ryt%)/2,len_
        550 an(fly)=FNnorm(an(fly))
560 IF fly>goodies GCOL 0,2 ELSE GCOL
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     2430 SYS'OS_Readyduvariables", temp%, temp%, temp% 2440 = |temp% 2450 : 2450 : 2460 DATA 8,0,0, 0,0,7, 0,2,5, 0,3,4 2470 DATA 8,0,3,0,1,2, 0,3,0,2,1,0 2480 DATA 3,0,0,4,3,0,5,2,0,7,0,0 2490 DATA 5,0,2,4,0,3,3,0,4,2,0,5 2500 .
                                                                                                                                                                                                                                                                                                                                              y%)
1470 bot%=FNrand((b_lft%+b_ryt%)/2,len_
 0.1
          570 ix=COSRAD(an(fly))*speed
                                                                                                                                                                                                                                                                                                                                             1480 mid%=(top%+bot%+lft%+ryt%)/4
1490 IF (top%+> 16)>35 STOP
1500 IF (bot% > 16)>35 STOP
1510 IF (lft%+> 16)>35 STOP
1510 IF (lft%+> 16)>35 STOP
1520 IF (ryt% > 16)>35 STOP
1530 IF len_x%<2 THEN
1540 FROCquarter(x%,y_top%,len_x%,ly_top%,len_x%,ly_top%,len_x%,ly_top%,len_x%,ly_top%,len_x%,ly_top%,len_x%,ly_top%,len_x%,ly_top%,len_x%,ly_top%,len_x%,ly_top%,len_x%,ly_top%,len_x%,ly_top%,len_x%,ly_top%,len_x%,ly_top%,len_x%,ly_top%,len_x%,ly_top%,len_x%,ly_top%,len_x%,ly_top%,len_x%,ly_top%,len_x%,ly_top%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,len_x%,lop%,le
                                                                                                                                                                                                                                                                                                                                                  1480 mid%=(top%+bot%+1ft%+ryt%)/4
         580 iy=SINRAD(an(fly))*speed
590 IF search(fly)=-2 ix=2*ix:iy=2*iy
                                                                                                                                                                          EFFFFFF LISE FRINTTAB (30, 14); xx%
550 INDUTAB (30, 16) 1%
570 IF 1%>=256 AND 1%<=1024 yx%=1% AND
EFFFFFF CLSE FRINTTAB (30, 16); yx%
550 INDUTTAB (30, 16); xy%
550 IF 1%>=1 AND 1%<=xx%/8 xp%=1% ELSE
FRINTTAB (30, 18); xx%
650 INDUTTAB (30, 20) 1%
650 INDUTTAB (30, 20) 1%
650 INDUTTAB (30, 20); yx%
620 OFF:CLS
630 xx%=(1280-xx%)/8:yx%=(1024-yx%)/8
640 xpoints%=xx%/(4*xp%):ypoints%=yx%/
(4*yp%)
 600 bang-FKbang
610 IF bang-80 an(fly)=FNnorm(180-(an(fly)-bang)-bang)
620 IF RND(honk(fly))=RND(honk(fly)) T
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         2510 DATA 2, 64, 2,128, 2,192, 7,
 620 IF RND(honk(fly))=RND(honk(fly)) T

HNN

630 STEREO 1, sx(fly)/5

640 SOUND 1,-10, fly*10-50*(fly<=goodie

s)+50,1

650 For fly2=1 To flies

660 IF fly2<>fly THEN

670 IF fly>goodies AND fly2<=goodies T
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         2520 DATA 7, 64, 7,128, 8, 64, 8,12
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         2530 DATA 8,192, 13, 0, 13, 64, 13,12
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          2540 DATA 13,128, 13,192, 28, 0, 24, 6
       670 If flygoodies AND fly2

880 dx=sx(fly2)=sx(fly)

690 dy=sy(fly2)=sy(fly)

700 dist=sQR(dx*dx+dy*dy)

710 hx(fly2)=(dx/dist)*500

720 hy(fly2)=(dx/dist)*500

730 search(fly2)=-2

740 ELSE

750 hx(fly2)=sx(fly)

760 py(fly2)=sy(fly)

770 search(fly2)=1

790 ENDLF

990 ENDLF

990 NEXT fly2

810 GCDL 0, 3

820 ENDLF

830 sx(fly)+=ix:sy(fly)+=ix

830 sx(fly)+=ix:sy(fly)+=ix
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          2550 DATA 24,128, 24,192, 37,128, 37,19
                                                                                                                                                                         (4*yp%)
650 FOR I%=save% TO save%+xpoints%*ypo
                                                                                                                                                                                                                                                                                                                                          1600 ELSE
1610 PROCquarter(x lft*, y_top*, lx lft*, ly_top*, lx lft*, top*, lft*, mid*, l)
1620 PROCquarter(x ryt*, y_top*, lx_lyt*, ly_top*, top*, t_ryt*, lo*, lx_ryt*, ly_top*, top*, t_ryt*, mid*, ryt*, 2)
1630 PROCquarter(x lft*, y_bot*, lx_lft*, ly_bot*, lt*, mid*, lft*, bot*, lx_lft*, mid*, lft*, bot*, lx_lft*, mid*, lft*, bot*, lx_lft*, ly_bot*, mid*, ryt*, bot*, lx_ryt*, ly_bot*, mid*, ryt*, bot*, b_ryt*, 4)
1650 ENDIF
1650 ENDIF
1650 ENDIPOC
1680 :
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          2560 DATA 52, 0, 48, 64, 48,128, 48,19
                                                                                                                                                                         ints%*4 STEP 4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          257Ø DATA 48,192, 49, Ø, 49, 64, 49,12
                                                                                                                                                                                660 !1%=0
                                                                                                                                                                                670 NEXT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          2580 DATA 49,192, 32, 64, 18,192, 19,
                                                                                                                                                                                 68Ø PROCassemble
                                                                                                                                                                                690 RESTORE ERROR
700 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         2590 DATA 19, 64, 19,128, 19,192, 2, 6
                                                                                                                                                                        710:
720 DBF PROCPrint(C$,x$,y$)
730 LOCAL I$
740 PRINT TAB(x$,y$);
750 FOR I$=1 TO LEN(C$)
760 COLOUR gool$(C$ MOD 36) TINT tint$
(C$ MOD 36)
770 PRINT MID$(C$,I$,1);
780 C$=1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       Listing 5
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     10 REM Mindmaster (Info5)
20 REM by J A McRugh
30 REM for all machines
40 REM (c) EAU January 1992
50:
60 ON ERROR IF ERR=17 MODE7:END ELSE
REPORT:PRINT* at line *;:ERL:END
70 MODE 7
80 PROCc(0)
90 DIM cols(4), ins(4), mark(4,2), used
          820 EMDIF
830 Ex(fly)+=ix:sy(fly)+=iy
840 CIRCLE FILL sx(fly),sy(fly),size
850 PROCline(-30):PROCline(30)
                                                                                                                                                                                                                                                                                                                                                    1690 DEF PROCplot(x%,y%,c%)
1700 IF save%!((x%*ypoints%+y%)*4)=c% E
                                                                                                                                                                                780 C%+=1
790 NEXT
                                                                                                                                                                                                                                                                                                                                                  1710 save%!((x%*ypoints%+y%)*4)=c%
1720 GCOL gcol%(c%>>16) TINT tint%(c%>>
           860 NEXT fly
870 UNTIL FALSE
                                                                                                                                                                                  800 ENDPROC
                                                                                                                                                                                  820 DEF PROCdrawscreen
                                                                                                                                                                                                                                                                                                                                               1738 RECTANGLE FILL(x0%+x%*xp%)*4,1024-
(y0%+(y%+1)*yp%)*4,(xp%-1)*4,(yp%-1)*4
1746 ENDPROC
                                                                                                                                                                               820 BEF PROCdrawscreen
830 LOCAL x%,y%,len_x%,len_y%,t_lft%,t
ryt%,b_lft%,b_ryt%
840 x%=0:y%=0
850 len_x%=xpoints%:len_y%=ypoints%
850 len_t%=(RBUG36)-1)<<16
870 t_ryt%=(RBUG36)-1)<<16
880 b_lft%=(RBUG36)-1)<<16
890 b_ryt%=(RBUG36)-1)<<16
900 PROCplot(x%,y%,t_lft%)
910 PROCplot(x%,y%,t_lft%)
910 PROCplot(x%,y%,t_lft%)
910 PROCplot(x%,y%,t_lft%)
930 PROCplot(x%,y%,t_lft%)
930 PROCplot(x%,y%,t_lft%)
930 PROCplot(x%,y%,t_lft%)
930 PROCplot(x%,y%,t_lft%)
931 PROCplot(x%,y%,t_lft%)
932 PROCplot(x%,y%,t_lft%)
934 PROCplot(x%,y%,t_lft%)
935 PROCplot(x%,y%,t_lft%)
936 PROCplot(x%,y%,t_lft%)
937 PROCplot(x%,y%,t_lft%)
938 PROCplot(x%,y%,t_lft%)
939 PROCplot(x%,y%,t_lft%)
939 PROCplot(x%,y%,t_lft%)
930 PROCplot(x%,y%,t_lft%)
930 PROCplot(x%,y%,t_lft%)
931 PROCplot(x%,y%,t_lft%)
932 PROCplot(x%,y%,t_lft%)
933 PROCplot(x%,y%,t_lft%)
934 PROCplot(x%,y%,t_lft%)
935 PROCplot(x%,y%,t_lft%)
936 PROCplot(x%,y%,t_lft%)
937 PROCplot(x%,y%,t_lft%)
938 PROCplot(x%,y%,t_lft%)
938 PROCplot(x%,y%,t_lft%)
939 PROCplot(x%,y%,t_lft%)
939 PROCplot(x%,y%,t_lft%)
939 PROCplot(x%,y%,t_lft%)
939 PROCplot(x%,y%,t_lft%)
939 PROCplot(x%,y%,t_lft%)
          880 : BF FNbang
980 IBF FNtbang
1980 IBF sx(fly)+ix<=size-620 THEN = 180
1980 : Fay(fly)+iy<=size-480 THEN = 270
1910 : Fay(fly)+ix>=620-size THEN = 0
1910 : Fay(fly)+iy>=480-size THEN = 90
1940 = -1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  90 DIM col$(4), in$(4), mark(4,2), used(
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               100 REPEAT
                                                                                                                                                                                                                                                                                                                                                   1750 :
1760 DEF FNrand(c%,1%)
1760 DEF FNrand(c%,1%)
1770 LOCAL new%, change%
1780 change%:(1%/2-RND(1%))*grain%/20
1780 change%:(1%BS(change%) MOD 18) <<
6) * SGN(change%)
1800 IF (c%+change%) OR c%+change%>=(3
<< 16)) THEN
1810 new%=c%-change%
1820 ELSE
1830 new%=c%+change%
1840 ERDIF
1840 ERDIF
1850 new%
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               110 PROCscreen
120 PROCinit
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                130 REPEAT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          130 REPEAT
140 PROCQUESS
150 right=Fkmark
160 UNTL Quess=8 OR right=4
170 IF right=4 PROCtwice(5,20,801$+" -
WELL DONEN ') LISE PROCtwice(5,20,801$
180 PRINTTAB(12,23);CHR$135; "ANOTHER G
ME ? ";
   940 =-1

950 EF PROCline(ang)

970 LINE ex(fly) +COSRAD(an(fly)+ang)*s

ire*2,sy(fly)+SINRAD(an(fly)+ang)*size*2

,sx(fly),sy(fly)
          98Ø ENDPROC
          990
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       AME ? ";
190 finished=NOTFNyorn
200 UNTIL finished
210 MODE 7
220 END
                                                                                                                                                                         _ryt%)
940 PROCquarter(x%,y%,len_x%,len_y%,t_
1ft%,t_ryt%,b_1ft%,b_ryt%,1)
950 ENDPROC
      1000 DEF FNnorm(a)
1010 IF a>180 THEN =a-360
1020 IF a<-180 THEN =a+360
1030 =a
                                                                                                                                                                                                                                                                                                                                                     1850 =new%
                                                                                                                                                                                 960
                                                                                                                                                                                                                                                                                                                                                     1860 :
                                                                                                                                                                             950 :
970 DEP PROCCYCLe
980 LOCAL c%
990 ch=0: FR15,1
1000 REPEAT
1010 CALL start
1030 UNTIL INKEY(0)<>-1
1030 UNTIL INKEY (0)<>-1
1040 HHILE c% MOD 33 <> 0
1050 CALL start
                                                                                                                                                                                                                                                                                                                                                     1870 DEF FNmemval(colour%)
                                                                                                                                                                                                                                                                                                                                               1876 DEF FAMEWAI(COLOUTS)
1888 LOCAL gcol% tintk, memwal%
1893 memwal%=0
1990 colour%=colour% MOD 36
1910 gcol%=gcol%(colour%):tint%=tint%(colour%)
1920 memwal%=memwal% OR (tint%>>6)
1930 memwal%=memwal% OR ((gcol% AND 1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     230 : 240 DRF PROCINIT
250 PROCINIC(8,20,CHR$135+"ALLOW DOUB
LE COLOURS ?")
260 doubles=RNyorn:guess=0
270 cols$="ROYBHCM"
280 ans$=":sol$="
290 FOR i=1 TO 7
380 used(1) =PALSE
310 NEXT
320 FOR i=1 TO 4
330 REPRAT
340 col=RND(7)
350 UNTIL NOT used(col)
360 used(col)=NOT doubles
370 col$(i)=MID$ (cols$,col,1)
380 ans$=ans$+col$(i)
390 sol$=sol$+CHR$(144+col)+CHR$175+CH
R$175
   Listing 4
              10 REM >Plasma Clouds (Info4)
20 REM by Phil Le Sueur
30 REM for Archimedes/A3000
40 REM (c) BAU January 1992
                60 ON ERROR PROCETTOT (TRUE)
                                                                                                                                                                                                                                                                                                                                                   << 2)
1940 memval%=memval% OR ((gcol% AND (1)))</pre>
                70 PROCSetup
80 REPEAT
                                                                                                                                                                               1060 c%+=1
1070 ENDWHILE
           96 PROCgetvars
100 PROCdrawscreen:PROCcycle
110 UNTIL FALSE
120 END
                                                                                                                                                                                                                                                                                                                                                 << 4)) >> 1)
1950 memval%=memval% OR ((gcol% AND (1
                                                                                                                                                                                1080 *FX15,1
1090 ENDPROC
                                                                                                                                                                                                                                                                                                                                                    << 1)) << 3)
1960 memval%=memval% OR ((gcol% AND (3)))</pre>
                                                                                                                                                                          1100:
1110 DEP PROCQUARTER(x%,y%,len_x%,len_y%,t_lft%,t_ryt%,b_lft%,b_ryt%,q%)
1120 LOCAL x_lft%,x_ryt%,y_top%,y_bot%,
1130 LOCAL top%,bot%,lft%,ryt%,mid%
1140 CASE q% OF
1150 MHEN 1:
1160 PROCQLot(x%+len_x%-1,y%,t_ryt%)
1170 PROCDlot(x%+len_x%-1,y%,t_ryt%)
1170 PROCDlot(x%+len_x%-1,y%+len_y%-1,b_ryt%)
                                                                                                                                                                                                                                                                                                                                                    << 2)) << 3)
1970 memval%=memval% OR ((gcol% AND (1)))</pre>
            140 DEF PROCerror(restart%)
150 IF restart%=TRUE AND ERR=17 THEN R
                                                                                                                                                                                                                                                                                                                                                     < 5)) << 2)
1980 =memval%
                                                                                                                                                                                                                                                                                                                                                   1990 :
2000 DEP PROCassemble
2010 FOR pass%=0 TO 2 STEP 2
2020 Pk=code%
2030 [ OFT pass%
2040 .scrstart
2050 EQUD FNscreenadr+320*yo%+xo%
2060 .scrlines
2070 EQUD (yv%/4)-1
2080 .switchadr
2090 EQUD switch%
2100 :
                                                                                                                                                                                                                                                                                                                                                     1990
           160 IF ERR=17 MODE 0:END
170 ON:PRINTTAB(0,30);REFORT$;" at lin
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 400 NEXT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                410 sol$=sol$+CHR$156+CHR$135

420 sel$=CHR$135+*SELECT FOUR : *

430 FOR i=1 TO LEN(cols$)

440 sel$=sel$+CHR$(128+i)+MID$(cols$,i
            18Ø END
                                                                                                                                                                              ryt%)
1180 WHEN 2:
1190 PROCplot(x%+len_x%-1,y%+len_y%-1,b
           200 DEF PROCSetup
210 MODE 13
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        440 sel$=sel$+CHR$(128+1)+MID$(c, 1)
450 NEXT
450 ENDPROC
470:
450 ENDPROC
470:
450 ENCOC(1):REPEAT
500 k=INSTR(" TyMn",GET$) DIV 2
510 UNTIL k>0
520 PROCc(0)
530 = f(k=1)
          210 MODE 13
220 grain%=20
230 xw%=768;yw%=768
240 x%=2:yp%=2
550 DM gool%(35),tint%(36)
260 DIM save% 320*256*4
270 DIM code% (20+320*3)*4
280 DIM switch% 256
290 DIM temp% 8
360 FOR T%=0 TO 15
310 READ b%,g%,r%
320 COLOUR 1%,r%<4/,g%<4,b%<<4
330 NEXT
340 FOR T%=0 TO 35
350 READ gool%(1%),tint%(1%)
360 NEXT
                                                                                                                                                                                ryt%)
1200 WHEN 3:
                                                                                                                                                                                1210 PROCplot(x%,y%,t_lft%)
1220 WHEN 4:
                                                                                                                                                                                                                                                                                                                                                    | 2100 :
| 2110 .stat | LDR r0.scrstart | 2120 LDR r1.scrlines | 2130 LDR r2.switchadr | 2140 MOV r3.$0 | FNk1ate(xwk/4) | 2160 ADD r0.r0, f(320-xwk/4) | 2170 SUBS r1,r1.$1 | 1000
                                                                                                                                                                                 1230 PROCplot(x%,y%+len_y%-1,b_lft%)
                                                                                                                                                                                 1240 ENDCASE
                                                                                                                                                                                1240 ENDCASE

1250 IF len_x%<=2 AND len_y%<=2 ENDPROC

1260 IF INKEY(0) <> -1 PROCCycle

1270 x_lft%=x%;y_top%=y%

1280 lx_lft%=(len_x%+1)/2;ly_top%=(len_
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  53Ø =(k=1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 540:
550 DEF PROCC(s)
560 VDU 23;10,255-159*s;0;0;0;0;
570 ENDPROC
                                                                                                                                                                           1200 1X_11t%=(16H_X%+1//2.1y_top%=(16H_
y%+1)/2
1290 x_ryt%=x%+lx_lft%-1:y_bot%=y%+ly_t
                                                                                                                                                                                                                                                                                                                                                     2180 BPL
2190 MOVS
                                                                                                                                                                           op%-1

1360 lx_ryt%=len_x%-lx_lft%+1:ly_bot%=1

en_y%-ly_top%+1

1310 IF x%=0 THEN

1320 IF y%=0 THEN

1330 top%=FNrand((t_lft%+t_ryt%)/2,len_
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                580 :
590 DEF PROCScreen
600 VDU 12,132,157,135
610 FOR i=1 TO 22
620 VDU 31,0,i,132,157,32,156,31,37,i,
                                                                                                                                                                                                                                                                                                                                                    2200 | NEXT
2210 NEXT
2220 FOR I%=0 TO 255
2330 switch%71%=1%
2240 NEXT
2250 FOR I%=0 TO 34
2250 switch%7(FNmemval(I%))=FNmemval(I%)
             360 NEXT
370 ENDPROC
             390 DEF PROCEEtvars
                                                                                                                                                                            x%)
1340 ELSE
1350 top%=save%!((x_ryt%*ypoints%+y_top
             400 LOCAL I%
410 LOCAL ERROR
                                                                                                                                                                                                                                                                                                                                                    2280 BWITCHS:
+1)
2270 NEXT
2280 ENDPROC
2290 :
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                640 VDU 31,3,18,132,157,31,0,23,132,15
             420 ON ERROR LOCAL PROCETTOT (FALSE)
              430 CLS:ON:C%=0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                650 VDU 31,9,0:PRINT"INPUT"; SPC13; "REP
             440 PROCPrint("P L A S M A C L O U D
```

```
1550 .beta
1560 .gamma
1570 .base
1580 .xpos
1590 .ypos
1600 .mainlen
1610 .maxdepth
1620 .lsf
1630 .csf
    660 FOR i=1 TO 17:VDU 31,4,i,141:NEXT 670 FOR i=1 TO 17:VDU 31,19,i,132,157, 156:NEXT
                                                                                                                                                                                                                                                                                                                                                                              EQUD Ø \ +4
EQUD Ø \ +8
EQUD Ø \ +12
EQUD Ø \ +16
EQUD Ø \ +20
EQUD Ø \ +24
EQUD Ø \ +28
EQUD Ø \ +28
                                                                                                                                                                                                                                                                                                                                                                                                                                                               2740 SWI
2750 CMP
2760 SWILT
2770 SWIEQ
2780 SWIGT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         256+Ø
depth,#5
256+1Ø
256+2
                                                                                                                                                            380 DEF PROCchange (RETURN var, min, max,
                                                                                                                                                     380 DEF PROCchange (RETURN var. add, vrap)
390 var+=add
400 IF wrap THEN
410 IF varcmin var+= (max-min)
420 IF var>max var-= (max-min)
430 ELSE
440 IF varcmin var=min
450 IF var-max var=max
460 ENDIF
470 ENDERGO
          56.NEXT
680 POR 1=20 TO 21:VDU 31,4,1,141:NEXT
690 ENDPROC
780:
710 DEF PROCTWICE(x,y,str$)
720 PRINTTAB(x,y);str$;TAB(x,y+1);str$
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         RØ,#4
R1,[stack,#16]
R2,[stack,#20]
"OS_Plot"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                2790 MOV
                                                                                                                                                                                                                                                                                                                                                                                                                                                                2800 LDR
                                                                                                                                                                                                                                                                                                                                                                               EQUD Ø \ +32
EQUD Ø \ +36
EQUD Ø \ +40
                                                                                                                                                                                                                                                                                                                                                                                                                                                                2810 LDR
                                                                                                                                                                                                                                                                                                            1630 .csf
                                                                                                                                                                                                                                                                                                                                                                                                                                                                2820 SWI
                                                                                                                                                                                                                                                                                                            1640 .rsf
1650 .stackad
                                                                                                                                                                                                                                                                                                                                                                                                                                                                283Ø MOV
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         RØ, #5
                                                                                                                                                                                                                                                                                                                                                                            EQUD 0 \ +40
EQUD 0 \ +48
EQUD 0 \ +48
EQUD 0 \ +52
EQUD 0 \ +56
EQUD 0 \ +60
EQUD 0 \ +64
EQUD 0 \ +64
EQUD 0 \ +72
EQUD 0 \ +72
EQUD 0 \ +80
EQUD 0 \ +80
EQUD 0 \ +84
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       RØ,#5
R1,[stack,#24]
R2,[stack,#28]
"OS_Plot"
RØ,#5
R1,[stack,#36]
"OS_Plot"
R0,#4
R1,[stack,#40]
R2,[stack,#44]
"OS_Plot"
                                                                                                                                                             470 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                284Ø LDR
           750 DEF PROCquess
                                                                                                                                                                                                                                                                                                            1660 .ca
                                                                                                                                                                                                                                                                                                                                                                                                                                                                285Ø LDR
                                                                                                                                                                                                                                                                                                                                                                                                                                                              2850 LDR
2860 SWI
2870 MOV
2880 LDR
2890 LDR
2900 SWI
2910 MOV
2920 LDR
                                                                                                                                                             490 DEF PROCECTEEN
           760 guess=guess+1
770 PROCtwice(5,20,sel$)
780 *FX 21,1
                                                                                                                                                           490 DEF PROCSCREEN
500 COLORN 10,96,448
510 COLORN 11,80,48,32
520 PROCDOX("Alpha",0,1)
530 PROCDOX("Beta",2,1)
540 PROCDOX("Beta",2,1)
550 PROCDOX("Gamma",4,1)
550 PROCDOX("Kapsacino",10,2)
550 PROCDOX("Y position",10,2)
550 PROCDOX("Main length",12,2)
550 PROCDOX("Main length",12,2)
550 PROCDOX("Main length",12,2)
560 PROCDOX("Main length",12,2)
610 PROCDOX("Left scale",16,2)
610 PROCDOX("Left scale",16,2)
630 PROCDOX("Right scale",20,2)
630 MOUSE OBS
                                                                                                                                                                                                                                                                                                            1670 .88
                                                                                                                                                                                                                                                                                                            168Ø .ch
                                                                                                                                                                                                                                                                                                           1680 .cb
1690 .sb
1700 .cg
1710 .sg
1720 .p
1730 .q
1740 .c
1750 .s
1760 :
1770 .tree
           790 peg=1
800 done=FALSE
    810 REPENT
820 PROCc(1)
830 VDU 31,peg*3+3,guess*2
840 key$=GET$
850 PROCc(0)
860 IF Key$=CHR$127 AND peg<>1 peg=peg
-1.PROCpeg(peg*3+2,guess,0)
870 IF Key$=CHR$13 ND peg=5 done=TRUE
880 col=INSTR(cols$,key$)
890 IF col>0 AND peg<5 PROCpeg(peg*3+2,guess,col):ins(peg)=key$;peg=peg+1
900 UNTIL done
           810 REPEAT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                293Ø LDR
                                                                                                                                                                                                                                                                                                                                                                                                                                                                2940 SWI
                                                                                                                                                                                                                                                                                                                                                                                                                                                                295Ø MOV
                                                                                                                                                                                                                                                                                                                                                                        R13!, (RØ-R4, R14)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        R1, [stack, #24]
R2, [stack, #28]
"OS_Plot"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                2960 LDR
                                                                                                                                                                                                                                                                                                           1780 ADR vp, vars

1790 LDR t1, [vp, #28]

1800 CMP t1, depth

1810 LDMEQFD R131, (RØ-R4, PC)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                2970 LDR
                                                                                                                                                                                                                                                                                                                                                                                                                                                                298Ø SWI
                                                                                                                                                                                                                                                                                                                                                                                                                                                                2990 MOV
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         RØ, #5
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       RØ,#5
R1,#5
R2,[stack,#48]
R2,[stack,#52]
"OS_Plot"
t1,[stack]
t2,[vp]
RØ,t1,t2
RØ,#360
RØ,RØ,#360
R1,[stack,#40]
R2,[stack,#44]
                                                                                                                                                             630 MOUSE ON
640 MOUSE TO 1152,512
                                                                                                                                                                                                                                                                                                                                                   R131, (RØ-R4, PC)
stack, [vp, #44]
t1, #56
t2,t1,depth
stack, stack, t2
theta, [stack]
t1, [vp, #32]
t2,t1,1
t2,t2, ASR #16
t2,[stack,#4]
t1, [vp, #36]
t2,t1,1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                3000 LDR
                                                                                                                                                                                                                                                                                                            1820 LDR
                                                                                                                                                                                                                                                                                                                                                                                                                                                                3010 LDR
                                                                                                                                                             65Ø *POINTER 1
                                                                                                                                                                                                                                                                                                            183Ø MOV
                                                                                                                                                                                                                                                                                                                                                                                                                                                                3020 SWI
                                                                                                                                                                                                                                                                                                                                                                                                                                                              3020 SWI
3030 LDR
3040 LDR
3050 ADD
3060 CMP
3070 SUBGE
3080 LDR
3090 LDR
3100 LDR
                                                                                                                                                             660 MOUSE RECTANGLE 1024,0,255,1023
           91Ø ENDPROC
                                                                                                                                                                                                                                                                                                            1840 MUL
                                                                                                                                                             67Ø ENDPROC
                                                                                                                                                                                                                                                                                                            1850 ADD
          920 :
930 DEF FRMark
940 FOR i=1 TO 4
950 mark(i,1)=0:mark(i,2)=0
960 NEXT
                                                                                                                                                                                                                                                                                                           1850 ADD
1860 STR
1870 LDR
1880 MUL
1890 MOV
1900 STR
1910 LDR
1920 MUL
1930 MOV
                                                                                                                                                            690 DEF PROCbox(text$,y,arrows)
                                                                                                                                                            690 DEF PROCDOX(text$,y,arrows)
700 IF arrows THEN
710 VDU 31,64,y,arrows*2+134
720 VDU 31,79,y,arrows*2+135
730 ENDIF
740 VDU 5
750 MOVE 1024+(256-(LENtext$)*16)/2,10
-(v**2)
           970 markx=23:n=0
980 FOR i=1 TO 4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         R2, [stack, #44]
R3, [stack, #4]
           980 FOR i=1 TO 4

990 IF in$(i)=col$(i) PROCdo(i,i,4):n=
                                                                                                                                                                                                                                                                                                                                                                                                                                                               3100 LDR
                                                                                                                                                                                                                                                                                                                                                                                                                                                               311Ø ADD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         depth, depth, #1
                                                                                                                                                                                                                                                                                                                                                     t2,t1,1
t2,t2,ASR #16
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        tree
depth,depth,#1
t1,#56
                                                                                                                                                                                                                                                                                                                                                                                                                                                                3120 BL
      1000 NEXT

1010 FOR i=1 TO 4

1020 FOR j=1 TO 4

1030 IF i<>j AND in$(i)=col$(j) PROCdo(
                                                                                                                                                     23-(y*32)
760 PRINT text$
                                                                                                                                                                                                                                                                                                                                                                                                                                                                313Ø SUB
                                                                                                                                                                                                                                                                                                            194Ø STR
                                                                                                                                                                                                                                                                                                                                                     t2, [stack, #8]
t1, [vp, #40]
                                                                                                                                                                                                                                                                                                            1950 LDR
                                                                                                                                                                                                                                                                                                                                                                                                                                                                3140 MOV
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      t1, #56
t2,t1,depth
stack,tvp,#44]
stack,stack,t2
t1,[stack]
t2,[vp,#8]
R0,t1,t2
R0,#360
R0,R0,#360
R1,[stack,#32]
R2,[stack,#36]
R3,(stack,#86]
depth.depth,#1
                                                                                                                                                            770 VDU 4
780 ENDPROC
                                                                                                                                                                                                                                                                                                            1960 MUL
1970 MOV
                                                                                                                                                                                                                                                                                                                                                                                                                                                               3150 MUL
                                                                                                                                                                                                                                                                                                                                                     t2,t1,1
t2,t2,ASR #16
                                                                                                                                                                                                                                                                                                                                                                                                                                                                3160 LDR
                                                                                                                                                           780 ENDPROC
790:
800 DEF PROCINIT
810 SYS "0S_Byte",113,1
810 SYS "0S_Byte",112,2
830 PROCSCREEN
840 SYS "0S_Byte",112,1
850 PROCSCREEN
860 bank%=1
870 [alpha=30
880 [beta=330
890 [gamma=0
900 [base=90
                                                                                                                                                                                                                                                                                                            1980 STR
                                                                                                                                                                                                                                                                                                                                                     t2, [stack, #12]
                                                                                                                                                                                                                                                                                                                                                                                                                                                                317Ø ADD
    i,j,7)
1040 NEXT
                                                                                                                                                                                                                                                                                                                                                                                                                                                              3170 ADD
3180 LDR
3190 LDR
3200 ADD
3210 CMP
3220 SUBGE
3230 LDR
3240 LDR
                                                                                                                                                                                                                                                                                                           1990 MOV
                                                                                                                                                                                                                                                                                                                                                    t1,#0
t1,[stack,#16]
t1,[stack,#20]
t1,[stack,#28]
1,[stack,#24]
t1,[stack,#8]
t2,[vp,#64]
                                                                                                                                                                                                                                                                                                           1990 MOV
2000 STR
2010 STR
2020 STR
2030 STR
2040 LDR
2050 LDR
2060 MUL
2070 MOV
       1050 NEXT
       1060 =n
       1880 DEF PROCdo(peg1,peg2,c)
1890 IF mark(peg1,1)=1 OR mark(peg2,2)=
ENDPROC
       ENDPROC
1100 mark(peg1,1)=1
1110 mark(peg2,2)=1
1120 PROCyeg(markx,guess,c)
1130 markx=markx+3
1140 ENDPROC
                                                                                                                                                                                                                                                                                                                                                    t3,t1,t2
t3,t3,ASR #16
                                                                                                                                                                                                                                                                                                                                                                                                                                                               325Ø LDR
                                                                                                                                                                                                                                                                                                                                                                                                                                                               3260 ADD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     depth,depth,#1
tree
depth,depth,#1
t1,#56
t2,t1,depth
stack,tvp,#44]
stack,stack,t2
t1,[stack]
t2,(vp,#4|
R0,t1,t2
R0,#360
R1,[stack,#48]
R2,[stack,#52]
depth,depth,#1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        depth, depth, #1
                                                                                                                                                                        !gamma=Ø
!base=9Ø
!xpos=512
                                                                                                                                                                                                                                                                                                           2080 ADD
                                                                                                                                                                                                                                                                                                                                                                                                                                                               3270 BL
                                                                                                                                                                                                                                                                                                                                                    t3,[stack,#32]
                                                                                                                                                                                                                                                                                                           2090 STR
                                                                                                                                                                                                                                                                                                                                                                                                                                                               328Ø SUB
                                                                                                                                                                                                                                                                                                           2100 LDR
                                                                                                                                                                                                                                                                                                                                                   t2, (vp, #68]
t3, t1, t2
t3, t3, ASR #16
t3, (stack, #36]
t1, [stack, #46]
t2, [vp, #48]
t3, t1, t2
t3, t3, ASR #16
t3, t3, 1
t3, [stack, #40]
t2, [vp, #52]
t3, t1, t2
                                                                                                                                                                                                                                                                                                                                                    t2, [vp, #68]
                                                                                                                                                                                                                                                                                                                                                                                                                                                               329Ø MOV
    1150 :

1160 DEF PROCPEG(x,y,c)

1170 VDU 31,x,y*2-1

1180 IF c=0 VDU 32,32,32,8,8,8,10,32,32

,32 ELSE VDU 144+c,124,124,8,8,8,10,144+
                                                                                                                                                            920
                                                                                                                                                                        !ypos=64
!mainlen=200
                                                                                                                                                                                                                                                                                                           2110 MUL
                                                                                                                                                                                                                                                                                                                                                                                                                                                               3300 MIII
                                                                                                                                                                                                                                                                                                                                                                                                                                                               331Ø LDR
                                                                                                                                                            930
                                                                                                                                                                                                                                                                                                           212Ø MOV
                                                                                                                                                                                                                                                                                                                                                                                                                                                             3310 LDR
3320 ADD
3330 LDR
3340 LDR
3350 ADD
3350 CMP
3370 SUBGE
3380 LDR
3390 LDR
3400 LDR
3410 ADD
3410 ADD
                                                                                                                                                            940 !maxdepth=7
                                                                                                                                                                                                                                                                                                           213Ø STR
                                                                                                                                                            950 lscale=0.6
960 cscale=0.65
                                                                                                                                                                                                                                                                                                           214Ø LDR
                                                                                                                                                                                                                                                                                                           215Ø LDR
                                                                                                                                                                                                                                                                                                          2150 LDR
2160 MUL
2170 MOV
2180 ADD
2190 STR
2200 LDR
2210 MUL
2220 MOV
2230 STR
2240 LDR
    c,124,124
1190 ENDPROC
                                                                                                                                                            970 rscale=0.6
                                                                                                                                                       980 ENDFROC
990 E:
1000 DEP PROCdrawtree
1010 VDU 24.16;16;1007;1007;
1020 SYS "0S_Byte",112,bank%
1030 SYS "0S_Byte",112,bank% EOR 3
1040 11sf=lscale*65536
1050 [csf=cscale*65536
1050 [rsf=rscale*65536
1070 [ca=coss!(lalpha*4)
1080 [sa=sins!(lalpha*4)
1100 [sb=sins!(lbeta*4)
1110 [cg=coss!([damma*4)
                                                                                                                                                            98Ø ENDPROC
  Listing 6
           10 REM >ARMTree (Info6)
20 REM by Daniel Tray
30 REM for Archimedes only
40 REM (c) BAU January 1992
                                                                                                                                                                                                                                                                                                                                                     t3,t1,t2
t3,t3,ASR #16
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       depth, depth, #1
                                                                                                                                                                                                                                                                                                                                                    t3, [stack, #44]
                                                                                                                                                                                                                                                                                                                                                                                                                                                              3420 BL
3430 SUB
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        depth, depth, #1
 40 REM (c) BAU January 1992
50:
60 MODE 15:MODE 12:OFF
70 ON ERROR MODE 0:IF ERR=17 AND INKE
Y-1 END ELSE IF ERR=17 RUN ELSE PRINTREP
ORTS;" at line ":ERL:END
80 DIM stack% 4095, sins 360*4, coss 36
0*4,code% $400
90 PBCCode*
                                                                                                                                                                                                                                                                                                           2240 LDR
                                                                                                                                                                                                                                                                                                                                                    t1, [stack, #12]
t2, [vp, #56]
                                                                                                                                                                                                                                                                                                                                                                                                                                                              3440 LDMFD R13! (R0-R4.PC)
                                                                                                                                                                                                                                                                                                           225Ø LDR
                                                                                                                                                                                                                                                                                                           2260 MUL
2270 MOV
                                                                                                                                                                                                                                                                                                                                                                                                                                                              3450 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                            3450 | 3460 NEXT pass% 3460 NEXT pass% 3470 FOR T%=0 TO 359 3480 sins!(T%*4)=(SIN(RAD(I%)))*65536 3490 Coss!(T%*4)=(COS(RAD(I%)))*65536 3500 NEXT 3510 ENDPROC
                                                                                                                                                                                                                                                                                                                                                     t3.t3.ASR #16
                                                                                                                                                                                                                                                                                                           228Ø ADD
                                                                                                                                                                                                                                                                                             22, (vp, #60)

2310 NOV t3, t1, t2

2320 NOV t3, t3, ASR #16

2330 STR t3, [stack, #52]

2340 STMFP R131, [R3, R4]

2350 MOV index, #16

2360 MOV t2, theta, ASL #2

2370 LDR t1, [cos_ptr, t2]

2380 STR t1, (vp, #80]

2390 LDR t1, [sin_ptr, t2]

2400 STR t1, (vp, #84)

2410 .transform loop

2420 LDR t1, [stack, ind

2430 STR t1, [vp. #84]
                                                                                                                                                                                                                                                                                                                                                    t3,[stack,#48]
                                                                                                                                                                                                                                                                                                           229Ø STR
23ØØ LDR
                                                                                                                                                         1110 !cg=coss!(!gamma*4)
1120 !sg=sins!(!gamma*4)
1130 A%=!base
            90 PROCcode
                                                                                                                                                       1130 A%=1base
1140 B%=1xpos
1150 C%=1ypos
1150 D%=1mainlen
1170 E%=0
1180 F%=coss
1190 G%=sins
1200 CALL tree
1210 VDU 24,0;0;1279;1023;
1220 ENDPROC
1230 :
         100 PROCinit
                                                                                                                                                                                                                                                                                                                                                                                                                                                          Listing 7
         110 PROCdrawtree
         120 PROCswap
                                                                                                                                                                                                                                                                                                                                                                                                                                                                   10 REM >Snowflake (Info7)
20 REM by John Knowles
30 REM for all machines
40 REM (c) BAU January 1992
          130 REPEAT
          140 REPEAT
       140 REPAN
150 MOUSE mx,my,mz
160 mx=mx DIV 16
170 my=31-(my DIV 32)
180 add-((mx=64)-(mx=79))*mz
190 opt=((my DIV 2)+1)*(my<=20)*((my M D 2)=0)
200 UNTIL add<>0 AND opt<>0
210 CASE opt oF
220 WHEN 1:PROCchange(!alpha,0,360,-a
                                                                                                                                                                                                                                                                                                                                                                                                                                                             50 :
60 MODE 0
70 INFUT "Number of points : "a%
80 INFUT "Divide by : "b
90 VDU 12,23;10,255;0;0;0;
100 DIM x%(a%),y%(a%)
110 cdiv=2*PI/a%
120 cx%=640:cy%=512:8%=512
130 FOR i=1 TO a%
140 t=cdiv*(i-1)
150 x%(i)=cx%+s%*COS t
160 y%(i)=cx%+s%*SIN t
170 PLOT 69,x%(i),y%(i)
180 NEXT
190 x%=x%(1);y%=y%(1)
200 FOR i%=1 TO 50000
210 r=RND(a%)
220 x%=x%+(x%(r)-x%)/b
230 y%=y%+(y%(r)-y%)/b
240 PLOT 69,x%,y%
250 NEXT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                     60 MODE Ø
                                                                                                                                                        1230 :
1240 DEF PROCSWAD
1250 VDU 24,16;16;1007;1007;
                                                                                                                                                                                                                                                                                                                                                  index, index, #4
t1, [stack, index], index, index, #4
t1, [vp, #76]
t1, [vp, #72]
t2, [vp, #86]
t3, t1, t2
t4, t3, ASR #16
t1, [vp, #84]
t2, [vp, #84]
t3, t1, t2
t4, t4, t3, ASR #16
t4, t4, t3, ASR #16
t4, t4, t2
t4, t4, t3, t1, t2
                                                                                                                                                       1250 WAIT
1270 SYS "OS_Byte",113,bank% EOR 3
1280 SYS "OS_Byte",112,bank%
                                                                                                                                                                                                                                                                                                           2450 LDR
                                                                                                                                                                                                                                                                                                           2460 SUB
                                                                                                                                                                                                                                                                                                         2470 STR
2480 LDR
2490 LDR
2590 MUL
2510 MOV
2510 LDR
2530 LDR
2540 MUL
2550 SUB
2560 ADD
2570 STR
2580 ADD
2590 LDR
2600 LDR
        230 WHEN 2:PROCchange(!beta,0,360,-ad
 d, TRUE)
240 WHEN 3:PROCchange(!gamma,0,360,-a
                                                                                                                                                         1300 bank%=bank% EOR 3
                                                                                                                                                       1310 VDU 24,0;0;1279;1023;
1320 ENDPROC
        250 WHEN 4:PROCchange(!base,0,360,-ad
                                                                                                                                                      1330 : MDPRCCOde
1330 : 1340 DBF PROCCode
1350 theta=0
1350 x=1
1350 v=1
1370 y=2
1380 l=3
1390 depth=4
1400 cos_ptr=5
1410 sin_ptr=6
1420 stack=7
1430 vp=8
1440 index=3
1450 tl=9
1460 t2=10
1470 t3=11
1480 t=4
                                                                                                                                                        1330
 d, TRUE)
260 WHEN 5:PROCchange(!xpos,20,1004,4
*add, FALSE)
270 WHEN 6:PROCchange(!ypos,20,1004,4
 280 MHEN 7:PROCchange(!mainlen,0,800,4*add,PALSE)
290 WHEN 8:PROCchange(!maxdepth,1,7,8
GNadd,PALSE)
300 WHEN 9:PROCchange(!scale,0,1,add*
0.01,FALSE)
310 WHEN 10:PROCchange(scale,0,1,add*
0.01,FALSE)
320 WHEN 11:PROCchange(rscale,0,1,add*
0.01,FALSE)
330 ENDCASE
340 PROCdrawtree
350 PROCdrawtree
350 PROCdrawt
360 UNTIL FALSE
370 :
                                                                                                                                                                                                                                                                                                                                                    t1, [vp, #72]
                                                                                                                                                                                                                                                                                                                                                    t2, [vp, #84]
                                                                                                                                                                                                                                                                                                                                                                                                                                                                250 NEXT
260 END
                                                                                                                                                                                                                                                                                                          2610 MUL
                                                                                                                                                                                                                                                                                                                                                    t3,t1,t2
t4,t3,ASR #16
                                                                                                                                                                                                                                                                                                          262Ø MOV
                                                                                                                                                                                                                                                                                                                                                   t1, [vp,#76]
t2, [vp,#80]
t3,t1,t2
t4,t4,t3,ASR #16
                                                                                                                                                                                                                                                                                                                                                                                                                                                         Listing 8
                                                                                                                                                                                                                                                                                                          2640 LDR
                                                                                                                                                                                                                                                                                                                                                                                                                                                                 10 REM >DTsrc - Module task demonstra
on (Info8)
20 REM By David Lawrence
30 REM For Archimedes only
40 REM (C) BAU January 1992
                                                                                                                                                                                                                                                                                                          265Ø MUL
                                                                                                                                                                                                                                                                                                          2660 ADD
                                                                                                                                                                                                                                                                                                          267Ø ADD
                                                                                                                                                                                                                                                                                                                                                    t4,t4,y
t4,[stack,index]
                                                                                                                                                         1490
                                                                                                                                                                                                                                                                                                         268Ø STR
                                                                                                                                                         1500 FOR pass%=0 TO 2 STEP 2
                                                                                                                                                                                                                                                                                                                                                 t4, (stack, index
index, index, #4
index, #56
transform_loop
R13!, (R3, R4)
256+18
                                                                                                                                                                                                                                                                                                         269Ø ADD
                                                                                                                                                        1510 P%=code%
1520 [OPT pass%
                                                                                                                                                                                                                                                                                                         2700 CMP
2710 BNE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                   50 :
60 DIM code% 1000
70 wp=12
80 sp=13
                                                                                                                                                       1530 .vars
1540 .alpha
                                                                                                                                                                                                                                                                                                          2720 LDMFD
                                                                                                                                                                                                                         EQUD Ø \ +Ø
```



```
590 MOV R0,#0
600 STR R0,[R2,#taskhandle]
610 .InitExit
620 LDMFD (sp)!,(R7-R11,pc)
630 .StarCommand
                                                                                                                                                                                                                                                                                                                                                                                                            RØ,#19
R1,Wp
R2,[Wp,#4]
"XWimp_SendMessage"
RØ,[Wp,#40]
RØ,#41000
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          R1, wp
R2, #0
R2, [wp, #4]
R2, [wp, #8]
R2, [wp, #12]
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           1690 MOV
1700 MOV
1710 STR
1720 STR
                                                                                                                                                                                                                                                                                                                                                             1140 MOV
1150 MOV
1160 LDR
          90 link=14
        100 pc=15
110 :
      120 taskhandle=256
130 FOR T%=4 TO 6 STEP 2:P%=0:O%=code%
140 [OFT T%
150 BQUD StartCode
150 EQUD InitCode
170 EQUD FinalCode
180 EQUD StriceCode
190 EQUD StriceCode
190 EQUD HelpString
200 EQUD HelpString
210 EQUD HelpString
210 EQUD HelpTable
220 EQUD Ø \ SWI chunk number
230 EQUD Ø \ SWI decode table
250 EQUD Ø \ SWI decode code
250 TitleString
         120 taskhandle=256
                                                                                                                                                                                                                               (sp)!, (link)
R2, RØ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1730 STR
                                                                                                                                                                                      640 STMFD
                                                                                                                                                                                                                                                                                                                                                              1190 CMP
1200 BLT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1740 SWI
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             "XWimp SendMessage"
                                                                                                                                                                                    65Ø MOV
66Ø ADR
                                                                                                                                                                                                                                                                                                                                                                                                              loadafile
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1750 B reg
1760 .FinalCode
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             repeat
                                                                                                                                                                                                                                R2,RØ
R1,TitleString
RØ,#2
                                                                                                                                                                                                                                                                                                                                                            1200 BLT
1210 MOV
1220 ADD
1230 MOV
1240 SWI
1240 SWI
1260 ADD
1270 ADD
1270 ADD
1290 LDRB
1300 CMP
1310 MOVEQ
1330 CMP
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           ode
(sp):,(R7-R11,link)
wp,[R12]
                                                                                                                                                                                   569 ADR R1, TitleString
670 MOV R0, #2
688 SMI "XOS_Module"
690 LDMFD (sp)! (pc)
700 .5tartCode
710 LDR wp, R12]
720 LDR R0, [wp, #taskhandle]
730 TEQ R0, #0
740 LDRGT R1, 726K
750 SWIGT "XWimp_CloseDown"
760 MOVGT R0, #0
770 STROT R0, [wp, #taskhandle]
780 MOV R0, #2200
7190 LDR R1, 726K
                                                                                                                                                                                                                                                                                                                                                                                                              RØ, #13
                                                                                                                                                                                                                                                                                                                                                                                                             RØ,#13
R1,wp,#44
R2,#0
"XOS_FSCONTrol"
R1,[wp,#20]
R1,wp,#44
R2,wp,#28
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1770 STMFD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            178Ø LDR
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1780 LDR
1790
1800 LDR
1810 TEQ
1820 LDRGT
1830 SWIGT
1840 MOV
1850 STR
1860 MOV
1870 MOV
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1796
1800 LDR R0, [wp,#taskhandle]
1810 TEQ R0,#0
1820 LDRGT R1,TASK
1830 SNIGT "WMimp_CloseDown"
1846 MOV R1,#0
1850 STR R1,[wp,#taskhandle]
1850 MOV R2, wp
1870 MOV R2, wp
1870 MOV R2, wp
1870 MOV R2, wp
1870 SNI "OS_Module"
1890 LDMPD [gp]; (R7-R11,pc)
1990 ServiceCode
1910 LDR wp,[wp]
                                                                                                                                                                                                                                                                                                                                                                                                           me
RØ,[R1],#1
RØ,#ASC"."
R3,R2
RØ,[R2],#1
RØ,#Ø
        250 EQUD 0 \ SWI de
260 .TitleString
270 EQUS "DoubleTake"
280 EQUB 0
       280 EQUS 0
290 ALIGN
300 .HelpString
310 EQUS "Double Take"
                                                                                                                                                                                                                                 R1, TASK
R2, TitleString
"XWimp_Initialise"
"XOS_Exit"
                                                                                                                                                                                     79Ø LDR
                                                                                                                                                                                                                                                                                                                                                               1340 BNE
                                                                                                                                                                                                                                                                                                                                                                                                              copyname
R10,#1
                                                                                                                                                                                                                                                                                                                                                                                                           BØØ ADR
                                                                                                                                                                                                                                                                                                                                                               1350 CMP
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           wp, [wp]
(sp)!, {link}
R1,#&49
                                                                                                                                                                                    810 SWI
                                                                                                                                                                                                                                                                                                                                                               1360 BNE
       310 EQUS Double Take 320 EQUS 9 100 (07 Oct 1991) Dave Lawr nce 340 EQUS 0 340 EQUS 0 350 ALIGN 360 .HelpTable 370 EQUS Desktop_DoubleTake 380 EQUS 0 380 ALIGN 380 ALIGN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1920 STMFD
                                                                                                                                                                                     820 SWIVS
                                                                                                                                                                                                                                                                                                                                                               1370 MOV
1380 STRB
                                                                                                                                                                                    820 SWIVS
830 STR
840 .repeat
850 MOV
860 SWI
870 CMP
880 CMPNE
890 BNE
900 LDR
910 CMP
920 SWIEQ
930 MOVEO
                                                                                                                                                                                                                                "XOS_Exit"
R1, [R12, #taskhandle]
LDR R0, mask
R1, wp
"XWimp_Poll"
R0, #17
R0, #18
repeat
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            1930 TEQ
1940 BEQ
                                                                                                                                                                                                                                                                                                                                                             1380 STRE
1390 MOV
1400 ORR
1410 STR
1420 MOV
1430 MOV
1440 MOV
1450 STR
1460 STR
1480 STR
1480 STR
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           R1,#&49
StartWimp
R1,#&4A
StartedWimp
R1,#&27
R14,#0
R14,[wp,#taskhandle]
(sp)!,(pc)
imp
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          1946 BEQ StartWimp
1956 TEQ R1,#44A
1968 BEQ StartedWimp
1970 TEQ R14,#20
1998 MOVEQ R14,#0
1998 STREQ R14,#0
1999 STREQ R14, #0
2008 LDMFD (sp)1, (pc)
2010 .StartWimp
2020 LDR R14, [wp,#taskhandle]
2030 TEQ R14, #0
2040 MVMEQ R14, #0
2050 STREQ R14, #0
2050 STREQ R14, #0,#taskhandle]
2050 STREQ R14, #0, #taskhandle]
2050 STREQ R14, #0, #taskhandle]
2050 ADREQ R0, #0, #c]pTable
2070 MOVEO R1,#0
                                                                                                                                                                                                                                 repeat
RØ,[wp,#16]
RØ,#Ø
         400 EQUD StarCommand
410 EQUD 0
420 EQUD 0
                                                                                                                                                                                                                                   "XWimp_CloseDown"
410 EQUD 0
430 EQUD 0
430 EQUD belp
440 EQUB 0
450 .help 8QUS "Double clicking and
holding the second click will open "
460 EQUS "application directories (sam
e as holding down Shift) or "
470 EQUS "send any file to !Edit (if 1
oaded)."
480 EQUB 13
490 EQUS "Do not use "Desktop_DoubleTa
ke, use "Desktop instead."
500 EQUB 0
510 ALIGN
520 .InitCode
                                                                                                                                                                                    930 MOVEQ
940 STREQ
950 SWIEQ
960 CMP
                                                                                                                                                                                                                                 R1,#Ø
R1,[wp,#taskhandle]
"XOS_Exit"
                                                                                                                                                                                                                                                                                                                                                               149Ø SWI
                                                                                                                                                                                                                                                                                                                                                               1500 .keepopen
1510 MOV RØ, #ASC"."
                                                                                                                                                                                960 CMP
970 BNE
980 SWI
990 MOV
1000 .wait
1010 CMP
1020 BEQ
1030 SWI
1040 SUB
1050 CMP
1050 BLT
1070 MOV
                                                                                                                                                                                                                                RØ, #5
repeat
"XOS_ReadMonotonicTime"
RIØ, RØ
SWI "XOS_Mouse"
R2, #0
"XOS_ReadMonotonicTime"
RØ, RØ, RIØ
RØ, RØ, RIØ
                                                                                                                                                                                                                                                                                                                                                               1520 STRB
1530 MOV
                                                                                                                                                                                                                                                                                                                                                                                                              RØ, [R3]
RØ, #&4ØØ
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            2070 MOVEO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            2080 LDMFD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              (sp)!, {pc}
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          2000 LDMPD (sp)1,(pc)
2000 LStartedWimp
2100 LDR R14,(wp,#taskhandle]
2110 CNN R14,#1
2120 MOYEO R14,#0
2130 STREO R14,(wp,#taskhandle]
2140 LDMPD (sp)1,(pc)
2150 \TASK EQUS "TASK"
2160 \11111111110000000000
2170 \98765432108976543210
2180 mask EQUD %10000001100000110
                                                                                                                                                                                                                                                                                                                                                                                                             RO, #£4400

RO, #17

RI, wp

R2, #0

R2, [wp,#4]

R2, [wp,#8]

R2, [wp,#12]

R2, [wp,#12]

R2, [wp,#24]

"XWimp_SendMessage"

repeat
                                                                                                                                                                                                                                                                                                                                                             1530 MOV
1540 STR
1550 MOV
1560 MOV
1570 MOV
1580 STR
1590 STR
1600 STR
1610 STR
1620 SWI
           520 .InitCode
                                                                                                                                                                                  1070 MOV
          520 InitCode

530 STMFD (sp)!, (R7-R11,link)

540 MOV R0,#6

550 MOV R3,#3300

560 SWI "XOS_Module"

570 BVS InitExit

580 STR R2, [wp]
                                                                                                                                                                                                                                 RØ, [wp, #taskhandle]
R1, [wp, #4]
RØ, R1
                                                                                                                                                                                  1080 LDR
                                                                                                                                                                                                                                                                                                                                                               163Ø B
                                                                                                                                                                                                                                                                                                                                                                                                               repeat
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        218 .Eask Equi $10000001100000110
2199 ]NEXT 2200 SYS *0S_File*,10,*%,DoubleTake*,&F
FA,,code%,O%
2210 *RMLoad %,DoubleTake
2220 END
         540 MOV
550 MOV
560 SWI
                                                                                                                                                                                                                                                                                                                                                               1640 .loadaf
                                                                                                                                                                                  1090 LDR
                                                                                                                                                                                  1100 CMP
                                                                                                                                                                                                                                                                                                                                                               165Ø MOV
                                                                                                                                                                                                                                                                                                                                                                                                              RØ, RØ, #&FØØ
RØ, [wp, #40]
RØ, #17
                                                                                                                                                                                  111Ø BEO
                                                                                                                                                                                                                                   repeat
                                                                                                                                                                                                                                                                                                                                                               166Ø ORR
                                                                                                                                                                                  1120 LDR
                                                                                                                                                                                  113Ø STR
                                                                                                                                                                                                                                                                                                                                                               168Ø MOV
```

#### **Pieces of Eight**

| Listing l                              | 550 LDA #&EF                  | 1140 JSR plot<br>1150 .notymag | 1730 STA flag<br>1740 LDA type%,Y |
|----------------------------------------|-------------------------------|--------------------------------|-----------------------------------|
| misting i                              | 560 STA store<br>570 LDA #&FF | 1150 .notymag<br>1160 LDX #&E9 | 1750 TAX                          |
| 10 pm/ .00 (p-01)                      | 580 STA ovflw                 | 1170 JSR scan                  | 1760 INX                          |
| 10 REM >SPSource (Po81)                | 590 JSR hpress                | 1180 BNE notmin                | 1770 .plotlp                      |
| 20 REM By Jon Baldwin & Rod Smith      | 600 .notl                     | 1190 JSR plot                  | 1780 LDA #&19                     |
| 30 REM For BBC B/B+/M/E                | 610 LDX #&86                  | 1200 JSR min                   | 1790 JSR oswrch                   |
| 40 REM (C) BAU January 1992 & Novembe  | 620 JSR scan                  | 1210 JSR plot                  | 1800 INY                          |
| 1986                                   | 630 BNE notr                  | 1220 .notmin                   | 1810 LDA type%,Y                  |
| 50 :                                   | 640 LDA #&10                  | 1230 LDX #£89                  | 1820 JSR oswrch                   |
| 60 PROCass<br>70 PROCcheck             | 650 STA store                 | 1240 JSR scan                  | 1830 LDA pnt%,Y                   |
| 80 PRINT"Saving code"                  | 660 LDA #0                    | 1250 BNE notmax                | 1840 STY temp%                    |
| 90 OSCLI"Save SPcode "+STR\$"code+" "+ | 670 STA ovflw                 | 1260 JSR plot                  | 1850 TAY                          |
|                                        | 680 JSR hpress                | 1270 JSR max                   | 1860 LDA x1%, Y                   |
| TR\$"0%+" 1500 1500"<br>100 END        | 690 .notr                     | 1280 JSR plot                  | 1870 JSR oswrch                   |
|                                        | 700 LDX #&C6                  | 1290 .notmax                   | 1880 LDA xh%,Y                    |
| 110 :                                  | 710 JSR scan                  | 1300 JMP keyprs                | 1890 JSR oswrch                   |
| 120 DEF PROCASS                        | 720 BNE notu                  | 1310 .end                      | 1900 LDA y1%,Y                    |
| 130 DIM code 1000                      | 730 LDA #&10                  | 1320 RTS                       | 1910 JSR oswrch                   |
| 140 osbyte=&FFF4:oswrch=&FFEE          | 740 STA store                 | 1330 :                         | 1920 LDA yh%,Y                    |
| 150 at1=&70:at2=&72:at3=&74:at4=&76    | 750 LDA #0                    | 1340 .init                     | 1930 JSR oswrch                   |
| 160 bt1=&78:bt2=&7A:bt3=&7C:bt4=&7E    | 760 STA ovflw                 | 1350 LDA #0                    | 1940 LDY temp%                    |
| 170 store=&80:ovflw=&81:flag=&82       | 770 JSR vpress                | 1360 STA at1                   | 1950 DEX                          |
| 180 temp%=&83:speed%=&84:count%=&85    | 780 .notu                     | 1370 STA at2                   | 1960 BNE plot1p                   |
| 190 type%=&1900:pnt%=&1A00             | 790 LDX #&D6                  | 1380 STA at3                   | 1970 LDA #0                       |
| 200 xi%=&1B00:xj%=&1C00                | 800 JSR scan                  | 1390 STA at4                   | 1980 STA count%                   |
| 210 x1%=&1D00:xh%=&1E00                | 810 BNE notd                  | 1400 STA bt1                   | 1990 RTS                          |
| 220 yi%=&1F00:yj%=&2000                | 820 LDA #&EF                  | 1410 STA bt2                   | 2000 :                            |
| 230 y1%=&2100:yh%=&2200                |                               | 1420 STA bt3                   | 2010 .zpress                      |
| 240 FOR pass=4 TO 6 STEP 2             | 830 STA store<br>840 LDA #&FF | 1430 STA bt4                   | 2020 JSR plot                     |
| 250 P%=£1500:0%=code                   | 850 STA ovflw                 | 1440 STA count%                | 2030 .zinc                        |
| 260 [OPT pass                          |                               | 1450 LDA #29                   | 2040 JSR rotate                   |
| 270 .draw                              | 860 JSR vpress<br>870 .notd   | 1460 JSR oswrch                | 2050 LDA #&FF                     |
| 280 JSR init                           | 880 LDX #&8C                  | 1470 LDA #&80                  | 2060 STA flag                     |
| 29Ø JSR plot                           | 890 JSR scan                  | 1480 JSR oswrch                | 2070 JSR inc                      |
| 300 RTS                                | 900 BNE notxred               | 1490 LDA #2                    | 2080 BMI zinc                     |
| 310 BRK                                | 910 JSR plot                  | 1500 JSR oswrch                | 2090 JSR plot                     |
| 320 :                                  | 920 JSR xred                  | 1510 LDA #0                    | 2100 LDX #&9E                     |
| 330 .trans<br>340 JSR init             | 930 JSR plot                  | 1520 JSR oswrch                | 2110 JSR scan                     |
| 350 .keyprs                            | 940 .notxred                  | 1530 LDA #2                    | 2120 BEQ zpress                   |
| 360 LDA #0                             | 950 LDX #&EB                  | 1540 JSR oswrch                | 2130 RTS                          |
| 370 STA flag                           | 960 JSR scan                  | 1550 RTS                       | 2140 :                            |
| 380 LDA #&0F                           | 970 BNE notxmag               | 1560 :                         | 2150 .rotate                      |
| 390 JSR &FFF4                          | 980 JSR plot                  | 1570 .scan                     | 2160 LDA #&FF                     |
| 400 LDA #&79                           | 990 JSR xmag                  | 158Ø LDA #&81                  | 2170 TAY                          |
| 410 LDX #£80                           | 1000 JSR plot                 | 1590 LDY #&FF                  | 2180 LDA type%,Y                  |
| 420 JSR &FFF4                          | 1010 .notxmag                 | 1600 JSR &FFF4                 | 2190 TAX                          |
| 430 CPX #0                             | 1020 LDX #&8B                 | 1610 CPX #&FF                  | 2200 INX                          |
| 440 BMI main                           | 1030 JSR scan                 | 1620 RTS                       | 2210 .rotlp                       |
| 450 JMP end                            | 1040 BNE notyred              | 1630 .inc                      | 2220 CLC                          |
| 460 .main                              | 1050 JSR plot                 | 1640 LDY count%                | 2230 INY                          |
| 470 LDX #&9E                           | 1060 JSR yred                 | 1650 INY                       | 2240 LDA #0                       |
| 480 JSR scan                           | 1070 JSR plot                 | 1660 STY count%                | 2250 STA at4                      |
| 490 BNE notz                           | 1080 .notyred                 | 1670 CPY speed%                | 2260 LDA xh%, Y                   |
| 500 JSR zpress                         | 1090 LDX #&8A                 | 1680 RTS                       | 2270 STA at3                      |
| 510 .notz                              | 1100 JSR scan                 | 1690 :                         | 2280 BPL raaa                     |
| 520 LDX #&B6                           | 1110 BNE notymag              | 1700 .plot                     | 2290 LDA #&FF                     |
| 530 JSR scan                           | 1120 JSR plot                 | 1710 LDY #&FF                  | 2300 STA at4                      |
| 540 BNE not1                           | 1130 JSR ymag                 | 1720 LDA #0                    | 231Ø SEC                          |

```
330 IF INKEY-23 PROCPT
340 IF INKEY-119 PROCENDS
350 IF INKEY-1 PROCED
360 *FX200
                                                                                                                                                                                                                                                                                                                     3510 ROR bt3
3520 ROR bt2
3530 ROR bt1
3540 CLC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           4700 STA bt1+1
4710 LDA #&20
4720 STA bt2+1
2330 LDA X1%, Y
2340 STA 412
2350 LDA X1%, Y
2340 STA 412
2350 STA 411
2370 ROR 413
2370 ROR 413
2380 ROR 412
2390 ROR 412
2490 SEC
2410 LDA X1%, Y
2420 SEC 413
2440 LDA X1%, Y
2420 SEC 413
2440 LDA X1%, Y
2420 SEC 413
2440 SEC 413
2450 SEC 413
2490 STA 413
2490 STA 413
2490 SEC 413
2590 LDA X1%, Y
2500 SEC 414
2550 LDA X1%, Y
2550 SETA b13
2570 LDA X1%, Y
2560 SETA b13
2590 LDA X1%, Y
2590 SEC 413
2590 LDA X1%, Y
2590 SEC 413
2590 LDA X1%, Y
2590 LDA X1%, Y
2590 LDA X1%, Y
2590 SEC 413
2590 LDA X1%, Y
2590 L
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               4730 LDA #&21
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          370 ?&19FF=in%:?&1AFF=N%
380 UNTIL (in%>&FD OR INKEY-97 OR INKE
                                                                                                                                                                                                                                                                                                                     3550 DEC store
3560 BNE raac
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             4740 STA bt3+1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             4750 LDA #&22
                                                                                                                                                                                                                                                                                                                     3560 BME raac

3570 RTS

3580:

3590 .hpress

3600 JSR plot

3610 .hlcop1

3620 LDY #&FF

3630 LDA &1900,Y

3640 TAX
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           4750 LDA #822
4760 STA bt4+1
4770 .scalp
4780 LDA (bt4),Y
4790 STA at4
4800 LDA (bt3),Y
4810 STA at3
4820 LDA (bt2),Y
4830 STA at2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Y-33)
390 PROCeet
400 IF INKEY-33 PROCeave:PROCIdata:PRO
Cload ELSE PROCch
410 UNTIL G%>2 AND G%<5
420 *PX 4
430 ENDPROC
                                                                                                                                                                                                                                                                                                                         364Ø TAX
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             4830 STA at2
4840 LDA (bt1),Y
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            440 :
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            450 DEF PROCinit
                                                                                                                                                                                                                                                                                                                         365Ø INX
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        498 DBF FROCHING
466 *FX 4.1
470 VDU 29,5409;512;19,0,4;0;
480 VDU 23,11,0;0;0;0
490 PROCDdr(-639,-511,639,340)
500 PROCDdr(-639,501,630,496)
510 PROCDdr(-639,508,639,508)
520 85="<SPACE> TO DRAW: <FN>KEYS TO E
                                                                                                                                                                                                                                                                                                                       3660 .hloop
3670 CLC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             4850 STA at1
4860 LDX #3
                                                                                                                                                                                                                                                                                                                     3670 CLC
3680 INY
3690 LDA xl%,Y
3790 ADC store
3710 STA xl%,Y
3720 LDA xb%,Y
3730 ADC ovflw
3740 STA xb%,Y
3750 DEX
3750 DEX
3750 BNE hloop
3770 LDA &EPP
3780 STA flag
3790 JSR inc
3800 BMI hloop1
3810 JSR plot
3810 JSR plot
3820 RTS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             4870 .dlp
4880 CLC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             4890 LDA at4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         4890 LDA at4
4900 BPL pos
4910 SEC
4920 .pos
4930 ROR at4
4930 ROR at4
4940 ROR at3
4956 ROR at1
4970 DEX
4980 BNE dlp
4990 LDA ovflw
5000 BNE larger
5000 BNE larger
5010 .smaller
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     520 s5=*<SPACE> TO DRAW: <FN>KEYS TO E
TYP

530 t5=****SUPER-PLOT****
540 a5=*<->***
550 b5=*ARROWS MOVE BOX: <RET> FIXES*
550 b5=*ARROWS MOVE BOX: <RET> FIXES*
550 DIM cli% 40

570 in%-1:N%--1:Re19FF=in%:761AFF=N%
580 type%-61900:pnt%-61A00
590 ?type%-61900:pnt%-61A00
610 x1%-61D00:rj%-61C00
610 x1%-61D00:rj%-61C00
620 y1%-61D00:rj%-61C00
630 y1%-62100:yh%-62200
640 c%=PALSe:f1%-f1X-TRUE
650 xx%-0:ny%-0:ic%-12:es%-1
660 speed%-854:J%-0:V%-0
670 FROCAGI(6):CCU 3,3
680 VDU 24, -635;-508;635;338;
690 ENDPROC.
   2630 LDA at1
                                                                                                                                                                                                                                                                                                                         3820 RTS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             5010 .smaller
5020 LDA (bt1),Y
   2640 SBC bt1
2650 STA at1
2660 LDA at2
                                                                                                                                                                                                                                                                                                                     3830 : vpress
3850 JSR plot
3860 vloop1
3860 vloop1
3860 LDA type%, Y
3890 TAX
3900 INX
3900 INX
3900 INX
3910 vloop
3920 CLC
3930 INY
3950 ADC store
3940 LDA y1%, Y
3950 ADC store
3956 STA y1%, Y
3970 LDA y1%, Y
3970 ADC ovflw
3890 STA y1%, Y
                                                                                                                                                                                                                                                                                                                         3830 :
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             5030 SEC
5040 SBC at1
2660 LDA at2
2670 SBC bt2
2680 STA at2
2690 CDA at3
2700 SBC bt3
2710 STA at3
2710 STA at4
2710 STA at4
2710 STA at4
2710 LDA xhx, Y
2760 STA bt4
2770 LDA xhx, Y
2760 STA bt2
2800 STA bt2
2800 STA bt2
2810 LDA xix, Y
2820 STA bt2
2810 LDA xix, Y
2820 STA bt2
2830 STA bt3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         5040 SPC at1

5050 STA (bt1),Y

5060 LDA (bt2),Y

5070 SPC at2

5080 STA (bt2),Y

5090 LDA (bt2),Y

5090 LDA (bt3),Y

5100 SPC at3

5110 STA (bt4),Y

5130 SPC at4

5140 STA (bt4),Y

5150 JPR scend

5160 .larger

5170 CLC

5180 LDA at1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          698 ENDPROC
700 :
710 DEF PROCEDI(xl,yb,xr,yt)
720 PLOT 12,xl,yb:PLOT14,xr,yb
730 PLOT 14,xr,yt:PLOT14,xl,yt
740 PLOT 14,xl,yb
750 ENDPROC
760 :
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          750 ENDERCC
760 :
770 DEF PROCNEW
783 in%=-1:1%=-1:7%=0;Y%=0
790 PROCCalc(0):?type%=4:?pnt%=0
800 ENDERCC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         5170 CLC
5180 LDA at1
5190 ADC (bt1),Y
5200 STA (bt1),Y
5200 STA (bt1),Y
5210 LDA at2
5210 LDA at2
5220 ADC (bt2),Y
5230 STA (bt2),Y
5240 LDA at3
5250 ADC (bt3),Y
5270 LDA at4
5280 ADC (bt4),Y
5290 STA (bt4),Y
5300 .scend
5310 BEY
5310 BEY
5310 BES
5310 BES
5310 BES
5310 BES
                                                                                                                                                                                                                                                                                                                     3990 STA yh%,Y
4000 DEX
4010 BNE vloop
4020 LDA #EFF
4030 STA flag
4040 JSR inc
4050 BNI vloop1
4060 JSR plot
4070 RTS
4080 :
4090 .xred
4100 LDA #0
4110 STA store
4120 STA ovflw
4130 JSR scale
4140 RTS
4150 :
                                                                                                                                                                                                                                                                                                                         3990 STA yh%, Y
2820 STA btl
2830 USR raab
2840 LDA at4
2850 STA xhs, Y
2860 LDA at2
2860 EDA at3
2870 STA xtls, Y
2860 LDA at2
2890 STA xtls, Y
2900 LDA at1
2910 STA xtls, Y
2920 LDA at2
2930 LDA w6
2940 STA at4
2950 LDA yhs, Y
2960 STA at3
2970 BPL raae
2880 LDA MEFT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            810
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            820 DEF FNx(r%)=x1%?r%+xh%?r%*256
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          830 :
840 DEF FNy(r%)=yl%?r%+yh%?r%*256
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        850 :E FNg
870 REPEAT
880 GM=INSTR("YYNN", GET$)
880 GM=INSTR("YYNN", GET$)
970 =G%
9710 :
9720 DEF FNChOOSE
9730 FROCPIDOX(U%, 0)
9740 IF J%>J% J%=J%
                                                                                                                                                                                                                                                                                                                    4150 : 4160 .xmag 4170 LDA #0 4180 STA store 4190 LDA #0 4210 STA ovflw 4210 STA cole 4220 RTS 4230 : 4220 RTS 4230 : 4240 .yred 4250 LDA #EFF 4260 STA store 4270 LDA #0 4280 STA scale 4300 RTS 4310 : 4320 .ymag
                                                                                                                                                                                                                                                                                                                         4150 :
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               534Ø RTS
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               5350 ]
5360 NEXT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            950 es%=es%+1
960 REPEAT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          970 IF INKEY-26 PROCEM
980 IF INKEY-122 PROCEM
990 UNIT INKEY-74 AND f1%=TRUE
   2990 STA at4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               537Ø ENDPROC
3000 SEC

3010 .raae

3020 LDA y1%, y

3030 STA at2

3040 LDA y1%, y

3050 STA at1

3060 ROR at3

3070 ROR at3

3070 ROR at1

3090 SEC

3100 LDA y1%, y

3110 SEC at1

3120 STA at1

3130 LDA y1%, y

3140 SEC at2

3150 STA at1
   3000 SEC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    5380 :
5390 DEF PROCCheck
5400 LOCAL sum%
5410 sum%=0
5420 FOR byte%=code TO 0%=1
5430 sum%=sum%+?byte%
5440 NEXT byte%
5450 Pk=Pk-4.500
5460 FF sum%=101400 ENDPROC
5470 PRINT "Checksum error - please check listing"
5480 END
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               5380
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1000 =J%
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1010 :
1020 DEF PROCDA
1030 PROCDAX(0X%,0Y%)
1040 J%=J%-1
1050 IF J%-0 J%=N%
1050 PROCPIDOX(J%,0)
1070 fl%=TRUE
1080 ENDPROC
1090 :
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1010
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1090 :
1100 DEF PROCEWD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    Listing 2
                                                                                                                                                                                                                                                                                                                       4320 .ymag
4330 LDA #&FF
4340 STA store
4350 STA ovflw
4360 JSR scale
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1110 PROCbox(ox%,oy%)
1120 J%=J%+1
3140 SEC at2
3150 STA at2
3160 LDA yl%, Y
3170 SEC at3
3180 STA at3
3190 LDA yl%, Y
3200 SEC at4
3220 CC
3230 LDA at1
3240 ADC bt1
3250 STA yl%, Y
3260 LDA at3
3250 STA yl%, Y
3260 LDA at3
3270 ADC bt2
3280 STA yl%, Y
3290 LDA at3
3390 ADC bt3
3310 STA yl%, Y
3390 ADC bt3
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          10 REM >SuperPL (Po82)
20 REM By Jonathan Baldwin
30 REM For BBC B/B+/M/E
40 REM (C) BAU January 1992 & Novembe
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1130 IF J%>N% J%=0
1140 PROCPrbox(J%,0)
1150 fl%=TRUE
                                                                                                                                                                                                                                                                                                                     4360 JSR scale
4370 RTS
4380:
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1160 ENDPROC

1170:

1180 DEF PROCSet

1190 PROCSet2:0x%=nx%:0y%=ny%

1200 ENDPROC

1210:

1220 DEF PROCSet2

1230 vx%=nx%:vy%=ny%:ENDPROC

1240:

1250 DEF PROCCOORT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  50:
60 IF PAGE<62300 THEN PAGE=62300:CHAI
N"SuperPL"
70 MODE 4
80 *Load SPCode
90 PROCInit
100 PROCIdit(t$)
110 PROCOde
120 PROCOde
120 PROCOde(1FROCDox(nx%,ny%))
130 ON REROR PROCERT
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1240 EF PROCCOORD
1250 DEF PROCCOORD
1260 IF INKEY-58 ny%=ny%+ic%;f1%=TRUE
1270 IF INKEY-42 ny%=ny%-ic%;f1%=TRUE
1280 IF INKEY-26 nx%=nx%-ic%;f1%=TRUE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      130 ON ERROR PROCETT
140 IF c%=FALSE PROCLOAD
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      150 PROCmain
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1290 IF INKEY-122 nx%=nx%+ic%:f1%=TRUE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      160 MODE 7
170 END
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1300 ENDPROC
                                                                                                                                                                                                                                                                                                                    4520 STA bt2
4530 STA bt3
4540 STA bt4
4550 LDY 419FF
4550 LDA 360re
4570 BNE ysetup
4590 LDA #41B
4600 STA bt1+1
4610 LDA #41C
4620 STA bt2+1
4630 LDA #41C
4630 LDA #41C
4640 STA bt3+1
4650 LDA #41C
4670 JMP scalp
4690 LDA #41F
     333Ø ADC bt4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       1310
     3340 STA yh%, Y
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1320 DEF PROCES
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  190 DEF PROCMAIN
200 REPEAT
210 PROCi(3,8$)
     335Ø DEX
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1330 IF INKEY-114 ic%=4:?speed%=0:VDU 7
1340 IF INKEY-115 ic%=12:?speed%=4:VDU
     3360 BNE rotlpj
     337Ø RTS
3380 :
3390 .rotlpj
3400 JMP rotlp
3410 .raab
3420 LDA #4
3430 STA store
3440 CLC
3450 .raac
3450 .raac
3460 LDA bt4
3470 BPL raad
3480 SEC
3490 .raad
3500 ROR bt4
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  220 REPEAT
230 *FX 15
240 PROCcm: PROCcoord
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   1350 IF INKEY-116 ic%=20:?speed%=8:VDU
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     1360 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 1360 ENDPROC

1370 :

1380 DEF PROCSS

1390 PROCDOX(vxk,vy%):PROCSet2

1400 PROCDOX(mxk,ny%)

1410 ENDPROC

1420 :

1430 DEF PROCDOX(xk,y%)

1440 PLOT 69,xk,yk;PLOT 12,xk-12,yk-12

1450 PLOT 13,xk+12,yk-12

1460 PLOT 13,xk+12,yk-12
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  250 IF (nx%<>vx% OR ny%<>vy%) PROCsq
260 IF (INKEY-99 AND f1%=TRUE) PROCban
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      d
270 IF INKEY-2 nx%=0:ny%=0
280 IF INKEY-90 CLG:PROChew:PROCbox(nx
%,ny%),
290 IF in%<1 GOTO 380
380 IF INKEY-21 PROCmir
310 IF INKEY-117 PROCplus
320 IF INKEY-118 PROCminus
```

# PAGES

| ■ 1470 PLOT 13,x%-12,y%+12                                                                                                          | 2620 ENDPROC                                                          | 375Ø ENDPROC                                                                                                                            | 4770 ENDPROC                                                                        |
|-------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| 1480 PLOT 13,x%-12,y%-12                                                                                                            | 2630 :                                                                | 3760 :                                                                                                                                  | 4780 :                                                                              |
| 1490 ENDPROC<br>1500 :                                                                                                              | 2640 DEF PROCSAVE<br>2650 IF in%<0 ENDPROC                            | 3770 DEF PROCCheck<br>3780 D%=-1:REPEAT                                                                                                 | 4790 DEF PROCGetlm<br>4800 PROCi(0,"<->ARROWS PUT BOXES ON E                        |
| 1510 DEF PROCband<br>1520 PROCbox(nx%, ny%):PROCset                                                                                 | 2660 PROCdis("**DATA-SAVING**")<br>2670 REPEAT                        | 3790 D%=D%+1<br>3800 IF (type%?D%=12 AND type%?(D%+1)=1                                                                                 | NDS <ret> FIXES")<br/>4810 es%=-1</ret>                                             |
| 1530 es%=0:N%=N%+1                                                                                                                  | 2680 PROCin                                                           | 2) OR pnt%?D%=pnt%?(D%+1) PROCout:in%=in                                                                                                | 4820 IF V%>=in% V%=0                                                                |
| 1540 PROCinc(12,N%):PROCcalc(N%)<br>1550 fl%=FALSE:f%=FALSE                                                                         | 2690 UNTIL LEN(fn\$)<8<br>2700 REM:CASSETTE USERS ONLY                | %-1<br>3810 UNTIL D%=in%-1                                                                                                              | 4830 REPEAT<br>4840 IF type%?(V%+1)=12 V%=V%+1                                      |
| 1560 PROCdis("*RUBBER-BANDING*")                                                                                                    | 2710 REM: VDU 28,0,4,39,4                                             | 3820 IF type%?in%=12 in%=in%-1                                                                                                          | 4850 UNTIL type%?(V%+1)=13                                                          |
| 1570 PROCi(3, " <space> TO KEEP: <return><br/>TO DROP")</return></space>                                                            | 2720 RESTORE 2830<br>2730 FOR F%=0 TO 3                               | 3830 ENDPROC<br>3840 :                                                                                                                  | 4860 PROCprbox(V%, 1):PROCprbox(V%+1, 1) 4870 REPEAT                                |
| 1580 REPEAT                                                                                                                         | 2740 st%=&1B00+((N%+1)*F%)                                            | 3850 DEF PROCout                                                                                                                        | 4880 IF INKEY-26 PROCprbox(V%,1):PROCpr                                             |
| 1590 PROCcoord: PROCcm<br>1600 IF nx%<>vx% OR ny%<>vy% PROCrub                                                                      | 2750 READ ad%<br>2760 FOR T%=0 TO N%                                  | 3860 IF type%?D%=13 W%=D%+1 ELSE W%=D<br>3870 FOR I%=W% TO in%-1                                                                        | <pre>box(V%+1,1):PROCdwn:PROCprbox(V%,1):PROC prbox(V%+1,1)</pre>                   |
| 1610 IF INKEY-99 AND f1%=TRUE PROCadd<br>1620 UNTIL INKEY-74 OR in%>&FD                                                             | 2770 st%?T%=ad%?T%<br>2780 NEXT T%                                    | 3880 pnt%?I%=pnt%?(I%+1):type%?I%=type%                                                                                                 | 4890 IF INKEY-122 PROCprbox(V%,1):PROCp<br>rbox(V%+1,1):PROCup:PROCprbox(V%,1):PROC |
| 1630 PLOT 12,ox%,oy%:PLOT 13,nx%,ny%                                                                                                | 2790 NEXT F%                                                          | ?(I%+1)<br>3890 NEXT                                                                                                                    | prbox(V%+1,1)                                                                       |
| 1640 IF f%=FALSE N%=N%-1:in%=in%-1<br>1650 ?&19FF=in%:?&1AFF=N%                                                                     | 2800 M%=&FFFFF1900<br>2810 W%=(&FFFF1B00+(N%+1)*4)                    | 3900 ENDPROC<br>3910 :                                                                                                                  | 4900 UNTIL INKEY-74<br>4910 es%=1                                                   |
| 1660 f1%=TRUE:es%=1                                                                                                                 | 2820 IF fn\$<>"" PROCoscli("SAVE "+fn\$+"                             | 3920 DEF PROCprbox(T%,Q%)                                                                                                               | 4920 PROCprbox(V%,1):PROCprbox(V%+1,1)                                              |
| 1670 PROCbox(nx%,ny%):PROCtitle<br>1680 ENDPROC                                                                                     | "+STR\$"M%+" "+STR\$"W%) 2830 DATA x1%,xh%,y1%,yh%                    | 3930 IF Q%=1 E%=pnt%?T% ELSE E%=T%<br>3940 ox%=FNx(E%):oy%=FNy(E%)                                                                      | 4930 ENDPROC<br>4940 :                                                              |
| 1690 :                                                                                                                              | 2840 REM: VDU 28,0,31,39,0                                            | 3950 PROCbox(ox%,oy%)                                                                                                                   | 4950 DEF PROCup                                                                     |
| 1700 DEF PROCrub<br>1710 PROCline(vx%, vy%)                                                                                         | 2850 ENDPROC<br>2860 :                                                | 3960 ENDPROC<br>3970 :                                                                                                                  | 4960 IF V%=in%-1 V%=-1<br>4970 T%=V%+2:PROCln(1)                                    |
| 1720 PROCline(nx%,ny%):PROCset2                                                                                                     | 2870 DEF PROCIN                                                       | 3980 DEF PROCends<br>3990 PROCES ("HIDDEN-LINE-EDIT")                                                                                   | 4980 ENDPROC<br>4990 :                                                              |
| 1730 ENDPROC<br>1740 :                                                                                                              | 2880 PROCi(3,"PICTURE'S NAME?")<br>2890 INPUT SPC(1)fn\$              | 4000 PROCbox(nx%,ny%):PROCgetln                                                                                                         | 5000 DEF PROCdwn                                                                    |
| 1750 DEF PROCADD<br>1760 N%=N%+1:PROCinc(13,N%)                                                                                     | 2900 ENDPROC<br>2910 :                                                | 4010 *FX 200,1<br>4020 PROCi(2," <space> CHOOSES END: <ret< td=""><td>5010 IF V%=0 V%=in%<br/>5020 T%=V%:PROCln(-1)</td></ret<></space> | 5010 IF V%=0 V%=in%<br>5020 T%=V%:PROCln(-1)                                        |
| 1770 PROCcalc(N%):PROCset                                                                                                           | 2920 DEF PROCi(n%,m\$)                                                | URN> TO FIX")                                                                                                                           | 5030 ENDPROC                                                                        |
| 1780 fl%=FALSE:f%=TRUE<br>1790 ENDPROC                                                                                              | 2930 *FX 15<br>2940 PRINTTAB(0,4); SPC(40)                            | 4030 PROCprex(V%):U%=V%<br>4040 *FX 15                                                                                                  | 5040 :<br>5050 DEF PROCln(K%)                                                       |
| 1800 :                                                                                                                              | 2950 le%=LEN(m\$)+n%+1                                                | 4050 REPEAT:G%=GET                                                                                                                      | 5060 REPEAT                                                                         |
| 1810 DEF PROCline(x%,y%)<br>1820 PLOT 12,ox%,oy%:PLOT 13,x%,y%                                                                      | 2960 PRINTTAB(n%,4);m\$<br>2970 VDU 31,1e%,4                          | 4060 IF G%=32 PROCmx<br>4070 UNTIL G%=13                                                                                                | 5070 IF type%?T%=12 T%=T%+K%<br>5080 UNTIL type%?T%=13                              |
| 183Ø ENDPROC                                                                                                                        | 2980 ENDPROC                                                          | 4080 PROCprex(U%)                                                                                                                       | 5090 V%=T%-1                                                                        |
| 1840 :<br>1850 DEF PROCinc(t%,n%)                                                                                                   | 2990 :<br>3000 DEF PROCtop                                            | 4090 IF U%=V% E%=pnt%?(V%+1):F%=pnt%?V%<br>ELSE E%=pnt%?V%:F%=pnt%?(V%+1)                                                               | 5100 ENDPROC<br>5110 :                                                              |
| 1860 in%=in%+1:type%?in%=t%:pnt%?in%=n%                                                                                             | 3010 FOR T%=1 TO 2                                                    | 4100 ox%=FNx(E%):oy%=FNy(E%)                                                                                                            | 5120 DEF PROCedit(t%)                                                               |
| 1870 ENDPROC<br>1880 :                                                                                                              | 3020 PRINTTAB(1,T%); STRING\$(38," ")<br>3030 NEXT T%                 | 4110 nx%=FNx(F%):ny%=FNy(F%)<br>4120 PROCset2:f1%=FALSE                                                                                 | 5130 PROCfind(t%)<br>5140 IF f%=FALSE PROCscrub(t%) ELSE PRO                        |
| 1890 DEF PROCcalc(n%)<br>1900 !&70=nx%:!&78=ny%                                                                                     | 3040 ENDPROC<br>3050 :                                                | 4130 PROCi(0,b\$+" <spc>DROPS")<br/>4140 REPEAT</spc>                                                                                   | Cpass(t%)<br>515Ø ENDPROC                                                           |
| 1910 PROCcalx(n%):PROCcaly(n%)                                                                                                      | 3060 DEF PROCoscli(\$cli%)                                            | 4150 PROCcoord: PROCcm                                                                                                                  | 5160 :                                                                              |
| 1920 ENDPROC<br>1930 :                                                                                                              | 3070 X%=cli%:Y%=cli% DIV 256<br>3080 CALL &FFF7                       | 4160 IF nx%<>vx% OR ny%<>vy% PROCrub:fl<br>%=TRUE                                                                                       | 5170 DEF PROCfind(r%)<br>5180 T%=-1:f%=FALSE                                        |
| 1940 DEF PROCcalx(n%)                                                                                                               | 3090 ENDPROC                                                          | 4170 UNTIL (INKEY-99 OR (INKEY-74 AND f1%                                                                                               | 5190 REPEAT                                                                         |
| 1950 x1%?n%=?&70:xh%?n%=?&71<br>1960 xi%?n%=?&72:xj%?n%=?&73                                                                        | 3100 :<br>3110 DEF PROCmir                                            | =TRUE)) 4180 PROCbox(nx%,ny%)                                                                                                           | 5200 T%=T%+1<br>5210 IF T%<>r% AND pnt%?r%=pnt%?T% AND(                             |
| 1970 ENDPROC                                                                                                                        | 3120 *FX 15,1                                                         | 4190 IF INKEY-99 PROCret:ENDPROC                                                                                                        | type%?T%=13 OR type%?(T%+1)=13) f%=TRUE                                             |
| 1980 :<br>1990 DEF PROCealy(n%)                                                                                                     | 3130 PROCdraw<br>3140 FOR T%=0 TO N%+1                                | 4200 IF U%=in% PROCfind(U%):IF f%=FALSE<br>PROCmv:ENDPROC                                                                               | 5220 UNTIL(T%=in% OR f%=TRUE)<br>5230 ENDPROC                                       |
| 2000 y1%?n%=?&78:yh%?n%=?&79                                                                                                        | 3150 ?&70=x1%?T%:?&71=xh%?T%                                          | 4210 N%=N%+1:PROCcalc(N%)                                                                                                               | 5240 :                                                                              |
| 2010 yi%?n%=?&7A:yj%?n%=?&7B<br>2020 ENDPROC                                                                                        | 3160 ?&72=xi%?T%:?&73=xj%?T%<br>3170 !&70=-!&70:PROCcalx(T%)          | 4220 FOR T%=in% TO V%+1 STEP-1<br>4230 type%?(T%+1)=type%?T%                                                                            | 5250 DEF PROCSCRUD(r%)<br>5260 IF pnt%?r% <n% procshft(r%)<="" td=""></n%>          |
| 2030 :                                                                                                                              | 3180 NEXT T%                                                          | 4240 pnt%?(T%+1)=pnt%?T%                                                                                                                | 5270 N%=N%-1:v%=pnt%?r%                                                             |
| 2040 DEF PROCdraw<br>2050 IFin%<1 ENDPROC                                                                                           | 3190 PROCdraw<br>3200 ENDPROC                                         | 4250 NEXT T% 4260 in%=in%+1:pnt%?(V%+1)=N%                                                                                              | 5280 FOR T%=0 TO in%<br>5290 IF pnt%?T%>v% pnt%?T%=pnt%?T%-1                        |
| 2060 ?&19FF=in%:?&1AFF=N%                                                                                                           | 3210 :<br>3220 DEF PROCPt                                             | 4270 IF V%=U% PROCtp(12,13):PROCplot(69                                                                                                 | 5300 NEXT T%<br>5310 PROCPASS(r%)                                                   |
| 2070 CALL &1500<br>2080 ENDPROC                                                                                                     | 3230 PROCCIS("***POINT-EDIT***")                                      | ,F%):PROCplot(69,N%) ELSE PROCtp(13,12)<br>4280 PROCdraw                                                                                | 5320 ENDPROC                                                                        |
| 2090 :<br>2100 DEF PROCTITIE                                                                                                        | 3240 PROCi(3,a\$+b\$)<br>3250 PROCbox(nx%,ny%)                        | 4290 IF V%=U% IF type%?(V%)=12 PROCedit<br>(V%)                                                                                         | 5330 :<br>5340 DEF PROCehft(r%)                                                     |
| 2110 PROCtop:PROCi(3,s\$)                                                                                                           | 3260 pt%=FNchoose                                                     | 4300 IF V%<>U% AND V%+2 <in% if="" td="" type%?(v<=""><td>5350 FOR T%=pnt%?r% TO N%-1</td></in%>                                        | 5350 FOR T%=pnt%?r% TO N%-1                                                         |
| 2120 PROCdis(t\$)<br>2130 ENDPROC                                                                                                   | 3270 nx%=FNx(pt%):ny%=FNy(pt%)<br>3280 es%=1:f1%=FALSE                | %+3)=12 PROCedit(V%+2)<br>4310 PROCcheck:PROCdraw                                                                                       | 5360 x1%?T%=x1%?(T%+1)<br>5370 xh%?T%=xh%?(T%+1)                                    |
| 2140 :                                                                                                                              | 3290 PROCset2                                                         | 4320 PROCtitle                                                                                                                          | 5380 xi%?T%=xi%?(T%+1)                                                              |
| 2150 DEF PROCCh<br>2160 IF in%=-1 GOTO 2220                                                                                         | 3300 PROC1(3,b\$+" POINT")<br>3310 REPEAT                             | 4330 ENDPROC<br>4340 :                                                                                                                  | 5390 xj%?T%=xj%?(T%+1)<br>5400 yl%?T%=yl%?(T%+1)                                    |
| 2170 PROCI(6, "THIS PICTURE DELETED? <y <="" td=""><td>3320 *FX 15</td><td>4350 DEF PROCret</td><td>5410 yh%?T%=yh%?(T%+1)</td></y> | 3320 *FX 15                                                           | 4350 DEF PROCret                                                                                                                        | 5410 yh%?T%=yh%?(T%+1)                                                              |
| N>")<br>2180 G%=FNg                                                                                                                 | 3330 PROCcoord:PROCcm 3340 IF nx%<>vx% OR ny%<>vy% PROCsq             | 4360 PROCline(nx%,ny%)<br>4370 PROCplot(12,E%)                                                                                          | 5420 yi%?T%=yi%?(T%+1)<br>5430 yj%?T%=yj%?(T%+1)                                    |
| 2190 IF G%<3 PROCdraw ELSE PROCsave                                                                                                 | 3350 UNTIL INKEY-74 AND f1%=TRUE                                      | 4380 PROCplot(13,F%):PROCtitle<br>4390 ENDPROC                                                                                          | 5440 NEXT<br>5450 ENDPROC                                                           |
| 2200 PROCnew<br>2210 IF G%>2 PROCload:ENDPROC                                                                                       | 3360 PROCdraw:PROCcalc(pt%) 3370 PROCdraw                             | 4390 ENDEROC<br>4400 :                                                                                                                  | 5460 :                                                                              |
| 2220 PROCi(8, "CONTINUE PROGRAM? <y n="">") 2230 G%=FNg:IF G%&lt;3 PROCload</y>                                                     | 338Ø PROCset:PROCtitle<br>339Ø ENDPROC                                | 4410 DEF PROCtp(a%,b%)<br>4420 type%?(V%+1)=a%                                                                                          | 5470 DEF PROCPASS(r%)<br>5480 FOR T%=r% TO in%-1                                    |
| 2240 ENDPROC                                                                                                                        | 3400 :                                                                | 4430 type%?(V%+2)=b%                                                                                                                    | 5490 type%?T%=type%?(T%+1)                                                          |
| 2250 :<br>2260 DEF PROCload                                                                                                         | 3410 DEF PROCDIUS 3420 PROCDIS("*LINE-ADDITIONS*")                    | 4440 ENDPROC<br>4450 :                                                                                                                  | 5500 pnt%?T%=pnt%?(T%+1)<br>5510 NEXT T%                                            |
| 2270 PROCtop                                                                                                                        | 3430 PROCi(0,a\$+b\$+" START")                                        | 4460 DEF PROCmx                                                                                                                         | 5520 in%=in%-1                                                                      |
| 2280 PRINTTAB(3,1); "1:START DRAWING " T<br>AB(21,1); "2:LOAD FILE ONLY"                                                            | 3440 PROCDOX(nx%,ny%)<br>3450 st%=FNchoose                            | 4470 IF U%=V% PROCprex(U%):U%=V%+1:PROC<br>prex(U%) ELSE PROCprex(U%):U%=V%:PROCpre                                                     | 553Ø ENDPROC<br>554Ø :                                                              |
| 2290 PRINTTAB(9,2); "3:LOAD FILE WITH IM                                                                                            | 3460 PROCi(1,a\$+b\$+" END")                                          | x(U%)                                                                                                                                   | 5550 DEF PROCdel<br>5560 TIME=0:REPEAT UNTIL TIME=200                               |
| AGE" 2300 f%=FALSE                                                                                                                  | 3470 f1%=FALSE<br>3480 J%=J%+1:IF J%>=N% J%=0                         | 4480 ENDPROC<br>4490 :                                                                                                                  | 557Ø ENDPROC                                                                        |
| 2310 REPEAT                                                                                                                         | 3490 end%=FNchoose<br>3500 IF st%=end% PROCbox(nx%,ny%):PROCt         | 4500 DEF PROCPlot(n%,r%)<br>4510 PLOT n%,FNx(r%),FNy(r%)                                                                                | 5580 :<br>5590 DEF PROCdis(d\$)                                                     |
| 2320 PROC1(9, "PRESS NUMBER OF CHOICE") 2330 G%=GET                                                                                 | itle:ENDPROC                                                          | 452Ø ENDPROC                                                                                                                            | 5600 LOCAL A%, X%, Y%                                                               |
| 2340 IF G%=49 f%=TRUB<br>2350 IF G%=50 PROC1d                                                                                       | 3510 PROCdraw<br>3520 T%=-1:f%=FALSE                                  | 4530 :<br>4540 DEF PROCPIEX(T%)                                                                                                         | 5610 A%=10:X%=0:Y%=10:b=&A00<br>5620 VDU 31,4,1                                     |
| 2360 IF G%=51 PROC1d:PROCdraw                                                                                                       | 3530 REPEAT                                                           | 4550 E%=pnt%?T%                                                                                                                         | 5630 FOR T%=1 TO LENG\$                                                             |
| 2370 UNTIL f%=TRUE<br>2380 PROCtop:PROCtitle                                                                                        | 3540 T%=T%+1:PROCslot(st%,end%)<br>3550 PROCslot(end%,st%)            | 4560 x%=FNx(E%):y%=FNy(E%)<br>4570 PLOT 4,x%-18,y%-18                                                                                   | 5640 p\$=MID\$(d\$,T%,1)<br>5650 ?b=ASCp\$                                          |
| 239Ø ENDPROC                                                                                                                        | 3560 UNTIL T%=in%-1 OR f%=TRUE                                        | 4580 PLOT 6,x%+18,y%+18                                                                                                                 | 5660 CALL &FFF1                                                                     |
| 2400 :<br>2410 DEF PROCID                                                                                                           | 3570 PROCcr(st%, end%)<br>3580 PROCcr(end%, st%)                      | 4590 PLOT 4,x%-18,y%+18<br>4600 PLOT 6,x%+18,y%-18                                                                                      | 5670 VDU 23,240,b?1,b?1,b?2,b?2,b?3,b?3<br>,b?4,b?4                                 |
| 2420 REPEAT: PROCin                                                                                                                 | 3590 IF f%=FALSE PROCinc(12,st%):PROCin                               | 4610 ENDPROC<br>4620 :                                                                                                                  | 568Ø VDU 23,241,b?5,b?5,b?6,b?6,b?7,b?7,b?8,b?8                                     |
| 2430 UNTIL LEN(fn\$)<8<br>2440 REM:CASSETTE USERS ONLY                                                                              | c(13,end%)<br>3600 PROCcheck                                          | 4630 DEF PROCmv                                                                                                                         | 5690 VDU 240,8,10,241,11,9                                                          |
| 2450 REM:VDU 28,0,4,39,4<br>2460 PROCoscli("LOAD "+fn\$)                                                                            | 3610 PROCprbox(st%,0)<br>3620 PROCprbox(end%,0)                       | 4640 B%=pnt%?in%<br>4650 PROCcalc(B%)                                                                                                   | 5700 NEXT T%<br>5710 ENDPROC                                                        |
| 2470 PROCIdata                                                                                                                      | 3630 es%=1:PROCdraw                                                   | 4660 PROCtitle                                                                                                                          | 5720 :                                                                              |
| 2480 REM:VDU 28,0,31,39,0<br>2490 ENDPROC                                                                                           | 3640 PROCbox(nx%,ny%):PROCtitle<br>3650 ENDPROC                       | 4670 ENDPROC<br>4680 :                                                                                                                  | 5730 DEF PROCMAC<br>5740 PROCdis("MACRO-TRANSFORMS")                                |
| 2500 :                                                                                                                              | 3660 :                                                                | 4690 DEF PROCminus                                                                                                                      | 5750 PROCi(11, "MOVE WHOLE DESIGN.")                                                |
| 2510 DEF PROCIdata<br>2520 in%=?&19FF:N%=?&1AFF                                                                                     | 3670 DEF PROCSlot(be%,fi%)<br>3680 IF pnt%?T%=be% AND pnt%?(T%+1)=fi% | 4700 PROCdis("**LINE-REMOVAL**") 4710 PROCbox(nx%,ny%)                                                                                  | 5760 CALL &1508<br>5770 PROCtitle                                                   |
| 2530 RESTORE 2610                                                                                                                   | type%?(T%+1)=13:f%=TRUE                                               | 4720 PROCgetln:PROCdraw<br>4730 IF type%?V%=12 PROCedit(V%):type%?                                                                      | 578Ø ENDPROC<br>579Ø :                                                              |
| 2540 FOR F%=3 TO 0 STEP-1<br>2550 READ ad%                                                                                          | 3690 ENDPROC<br>3700 :                                                | V%=12:V%=V%-1                                                                                                                           | 5800 DEF PROCerr                                                                    |
| 2560 st%=£1B00+(N%+1)*F%<br>2570 FOR T%=0 TO N%                                                                                     | 3710 DEF PROCCT(be%, fi%)<br>3720 IF f%=TRUE OR be%<>pnt%?in% ENDPRO  | 474Ø IF V%=in%-1 OR type%?(V%+2)=12 PRO<br>Cedit(V%+1):type%?(V%+1)=12:PROCcheck EL                                                     | 5810 *FX 4<br>5820 c%=TRUE                                                          |
| 2580 ad%?T%=st%?T%                                                                                                                  | c                                                                     | SE type%?(V%+1)=12                                                                                                                      | 5830 IF ERR=17 PROCesc("USE <tab> TO EX</tab>                                       |
| 2590 NEXT T%<br>2600 NEXT F%                                                                                                        | 3730 in%=in%+1:pnt%?in%=fi%:type%?in%=1                               | 4750 IF in%>0 PROCdraw ELSE in%=-1:N%=-                                                                                                 | IT PROGRAM"):PROCtitle:ENDPROC<br>5840 IF ERR>&BE AND ERR<&FF PROCesc("FI           |
| 2610 DATA yh%,yl%,xh%,xl%                                                                                                           | 3740 f%=TRUE                                                          | 4760 PROCbox(nx%,ny%):PROCtitle                                                                                                         | LE-SYSTEM ERROR*):PROCload:ENDPROC                                                  |
|                                                                                                                                     |                                                                       |                                                                                                                                         |                                                                                     |

| 5850 REPORT:PRINT" at line ";ERL:END 5860 ENDPROC                                                                     | 30 REM For BBC B/B/M/E/C                                                                                                                                                                                                                                                                                                         | 1150 IF T%=12 C%=0<br>1160 X%=A%;Y%=B%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2300 PROCeldraw(be,end) 2310 ox=X%:oy=Y%:ocx=cx:ocy=cy:otilt=ti       |
|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|
| 5870 :                                                                                                                | 40 REM (C) BAU January 1991 & January<br>1986                                                                                                                                                                                                                                                                                    | 1170 ENDPROC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 1t                                                                    |
| 5880 DEF PROCesc(i\$)<br>5890 IF es%=0 PLOT 12,ox%,cy%:PLOT 13,n                                                      | 50 :<br>60 IF PAGE<>&1500 THEN PAGE=&1500:CHA                                                                                                                                                                                                                                                                                    | 1180 :<br>1190 DEF PROCGET                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2320 REPEAT 2330 PROCCIOSS: PROCSpeed                                 |
| x%,ny% 5900 IF es%<0 PROCprbox(V%,1):PROCprbox                                                                        | IN "SuperPa" 70 DIM cst%(1),ast%(1),oscli% 40                                                                                                                                                                                                                                                                                    | 1200 VDU 26<br>1210 REPEAT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2340 PROCcm:PROCcheck<br>2350 IF INKEY-104 cx=cx+4:cy=cy+4            |
| (V%+1,1)                                                                                                              | 80 colfill=&1200:*LOAD ColFill 1200                                                                                                                                                                                                                                                                                              | 1220 L%=0:PROCspeed:PROCcm:PROCcur                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2360 IF INKEY-103 cx=cx-4:cy=cy-4                                     |
| 5910 IF es%>1 PROCprbox(J%,0)<br>5920 IF es%>2 PROCprbox(st%,0)                                                       | 90 *FX 18<br>100 *FX 11                                                                                                                                                                                                                                                                                                          | 1230 IF X%>1279 X%=2<br>1240 IF X%<0 X%=1279                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2370 IF INKEY-66 cy=cy+4<br>2380 IF INKEY-98 cy=cy-4                  |
| 5930 IF es%<>1 PROCbox(nx%,ny%)                                                                                       | 110 *FX 4,2<br>120 MODE 1:VDU 23;8202;0;0;0;<br>130 VDU 19,1,0;0;19,2,0;0;19,3,0;0;                                                                                                                                                                                                                                              | 1250 IF Y%<880 Y%=880<br>1260 IF Y%>1023 Y%=1023                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2390 IF INKEY-65 tilt=tilt+PI/20<br>2400 IF INKEY-2 tilt=tilt-PI/20   |
| 5950 REM: VDU 28,0,4,39,4                                                                                             | 120 MODE 1:VDU 23;8202;0;0;6;<br>130 VDU 19,1,0;0;19,2,0;0;19,3,0;0;<br>140 PROCmenu:VDU 20<br>150 PROCmetvars                                                                                                                                                                                                                   | 1270 UNTIL INKEY-1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2410 PROCCross                                                        |
| 5960 PROCi(7,i\$):PROCdel<br>5970 REM:VDU 28,0,31,39,0                                                                | 140 PROCmenu:VDU 20<br>150 PROCsetvars                                                                                                                                                                                                                                                                                           | 1280 VDU 24,0;32;1279;860;<br>1290 ENDPROC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2420 ox=X%:oy=Y%<br>2430 ocx=cx:ocy=cy:otilt=tilt                     |
| 598Ø ENDPROC                                                                                                          | 160 ON ERROR PROCETT<br>170 VDU 5:REPEAT                                                                                                                                                                                                                                                                                         | 1300 :<br>1310 DEF PROCrub                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2440 UNTIL(INKEY-74 OR INKEY-99 OR INKE<br>Y-1)                       |
| Listing 3                                                                                                             | 180 IF NOT INKEY(-129) PROCkey                                                                                                                                                                                                                                                                                                   | 1320 IF L% GCOLØ, C%: MOVE X%, Y%: DRAW A%,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2450 IF INKEY-1 F%=TRUE                                               |
| 10 REM Screen Converter (Po83)                                                                                        | 190 PROCcur<br>200 IF L%=0 PROCcheck                                                                                                                                                                                                                                                                                             | B%<br>1330 A%=X%:B%=Y%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2460 IF INKEY-74 G%=TRUE<br>2470 PROCeldraw(be,end)                   |
| 20 REM by Jonathan Baldwin<br>30 REM for BBC B/B+/M/E                                                                 | 210 UNTIL Z%<br>220 PROCms(0, "end")                                                                                                                                                                                                                                                                                             | 1340 ENDPROC<br>1350 :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2480 ex=X%:ey=Y%<br>2490 ecx=cx:ecy=cy:etilt=tilt                     |
| 40 REM (c) Acorn User November 1986                                                                                   | 230 END                                                                                                                                                                                                                                                                                                                          | 1360 DEF PROCcopys                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2500 UNTIL(F% OR G%)                                                  |
| 50 :<br>60 IF PAGE<&2300 PRINT"Page must be &                                                                         | 240 :<br>250 DEF PROCSetvars                                                                                                                                                                                                                                                                                                     | 1370 cst%(0)=X%:cst%(1)=Y%<br>1380 ast%(0)=cx:ast%(1)=cy                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2510 PROChase<br>2520 IF G% GCOL0,7:PROCeldraw(be,end):E              |
| 2300":END<br>70 ON ERROR VDU 26,12:REPORT:PRINT" a                                                                    | 260 K%=5:Z%=0<br>270 V%=0:H%=0                                                                                                                                                                                                                                                                                                   | 1390 VDU 7<br>1400 ENDPROC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | NDPROC<br>2530 PROCeldraw(be,end)                                     |
| t line ";ERL:END                                                                                                      | 28Ø C%=3:T%=3                                                                                                                                                                                                                                                                                                                    | 1410 :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2540 st=0                                                             |
| 80 *LOAD SPCODE 1500<br>90 MODE 7:REPEAT                                                                              | 290 X%=640:Y%=512<br>300 L%=0:A%=X%:B%=Y%                                                                                                                                                                                                                                                                                        | 1420 DEF PROCdumps<br>1430 LOCALM%, N%, cx, cy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2550 PROCsf:st=ang<br>2560 REPEAT:PROCsf                              |
| 100 INPUT"WHICH MODE", M% 110 UNTIL M%>=0 AND M%<6 AND M%<>3                                                          | 310 D%=16:tilt=0<br>320 cx=48:cy=48                                                                                                                                                                                                                                                                                              | 1440 M%=cst%(0)<br>1450 N%=cst%(1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2570 UNTIL ang>st:fin=ang<br>2580 PROCeldraw(be,end)                  |
| 120 MODE M%                                                                                                           | 330 S%=1:R%=1                                                                                                                                                                                                                                                                                                                    | 1460 cx=ast%(0)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2590 GCOL0,3                                                          |
| 130 PROCINIT:REPEAT<br>140 PROCId:PROCdraw                                                                            | 340 VDU 24,0;32;1279;860;<br>350 ENDPROC                                                                                                                                                                                                                                                                                         | 1470 cy=ast%(1)<br>1480 FOR Q%=-cy TO cy STEP4<br>1490 FOR J%cy TO cy STEP4                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2600 PROCeldraw(st,fin)<br>2610 ENDPROC                               |
| 150 UNTIL fn\$=""<br>160 PROCsave                                                                                     | 360 :<br>370 DEF PROCKEY                                                                                                                                                                                                                                                                                                         | 1490 FOR J%=-cx TO cx STEP4<br>1500 IF POINT(X%+(J%*S%),Y%+(Q%*R%))=0                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2620 :<br>2630 DEF PROCeldraw(start,stop)                             |
| 170 VDU 26,12:PRINT"Saved"                                                                                            | 380 *FX 21                                                                                                                                                                                                                                                                                                                       | GCOLØ, POINT (M%+J%, N%+Q%): PLOT69, X%+ (J%*S                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2640 PROChegin                                                        |
| 180 END<br>190 :                                                                                                      | 390 IF INKEY-51 PLOT 69,X%,Y%<br>400 IF INKEY-97 VDU7:PLOT 95,X%,Y%                                                                                                                                                                                                                                                              | %),Y%+(Q%*R%)<br>1510 NEXT,                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2650 FOR ang=start TO stop STEP PI/10<br>2660 PROCcalc                |
| 200 DEF PROCinit<br>210 VDU 29,640;512;                                                                               | 410 IF INKEY-118 AND INKEY-1 CLG:PROCE                                                                                                                                                                                                                                                                                           | 1520 S%=1:R%=1<br>1530 ENDPROC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2670 DRAW x,y<br>2680 NEXT                                            |
| 220 VDU 23;11,0;0;0;0                                                                                                 | 420 IF INKEY-106 PROCCOPYS                                                                                                                                                                                                                                                                                                       | 1540 :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2690 ENDPROC                                                          |
| 230 PROCbdr(-639,-511,639,340)<br>240 PROCbdr(-630,410,630,496)                                                       | 430 IF INKEY-90 PROCdumps<br>440 IF INKEY-55 L%=NOT L%:PROCde1(30)                                                                                                                                                                                                                                                               | 1550 DEF PROCching<br>1560 REPEAT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2700 :<br>2710 DEF PROChegin                                          |
| 250 PROCbdr(-639,398,639,508)<br>260 DIM cli% 40                                                                      | 450 IF INKEY-38 PROCms(0, "Rubbing out"<br>):C%=C% EOR 7                                                                                                                                                                                                                                                                         | 1570 W%=GET:E%=E%+1<br>1580 IF W%=48 U%=0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2720 sib=SIN(etilt):cob=COS(etilt)<br>2730 ang=start:PROCcalc         |
| 270 in%=-1:N%=-1:?&19FF=in%:?&1AFF=N%                                                                                 | 460 IF INKEY-68 PROCrub                                                                                                                                                                                                                                                                                                          | 1590 IF W%=49 U%=1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2740 MOVE x,y                                                         |
| 280 type%=&1900:pnt%=&1A00<br>290 ?type%=4:?pnt%=0                                                                    | 470 IF INKEY-21 AND INKEY-1 PROCSAVE<br>480 IF INKEY-33 AND INKEY-1 PROCload                                                                                                                                                                                                                                                     | 1600 IF W%=50 U%=2<br>1610 IF W%=51 U%=3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 275Ø ENDPROC<br>276Ø :                                                |
| 300 xi%=&1800:xj%=&1C00<br>310 xl%=&1D00:xh%=&1E00                                                                    | 490 IF INKEY-33 PROCSqr<br>500 IF INKEY-82 PROCdist                                                                                                                                                                                                                                                                              | 1620 VDU 19,U%,E%;0;<br>1630 UNTIL W%=13                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2770 DEF PROCealc<br>2780 sia=SIN(ang):coa=COS(ang)                   |
| 320 yi%=&1F00:yj%=&2000                                                                                               | 510 IF INKEY-87 AND INKEY-1 PROCloadna                                                                                                                                                                                                                                                                                           | 1640 VDU 19,U%,E%-1;0;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2790 x=ex+ecx*coa*cob-ecy*sia*sib                                     |
| 330 y1%=&2100:yh%=&2200<br>340 nx%=0:ny%=0                                                                            | me<br>520 IF INKEY-114 PROCeire                                                                                                                                                                                                                                                                                                  | 1650 ENDPROC<br>1660 :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2800 y=ey+ecx*coa*sib+ecy*sia*cob<br>2810 ENDPROC                     |
| 350 VDU 24,-639;-512;639;340;<br>360 ENDPROC                                                                          | 530 IF INKEY-116 CALL colfill, X%, Y%, T%<br>540 IF INKEY-117 PROCMIX                                                                                                                                                                                                                                                            | 1670 DEF PROCEIRC<br>1680 IF (cx<=0)OR(cy<=0) VDU7:ENDPROC                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2820 :<br>2830 DEF PROCCIOSS                                          |
| 370 :                                                                                                                 | 550 IF INKEY-118 PROCellipse                                                                                                                                                                                                                                                                                                     | 1690 VDU 29,X%;Y%;<br>1700 ox=cx                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2840 MOVE ox-ocx*COS(otilt),oy-ocx*SIN(                               |
| 380 DEF PROCEDT(x1,yb,xr,yt)<br>390 PLOT 4,x1,yb:PLOT 5,xr,yb                                                         | 560 IF INKEY-83 PROCehng<br>570 IF INKEY-115 PROCeprinter                                                                                                                                                                                                                                                                        | 1710 MOVE 0,0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | otilt) 2850 DRAW ox+ocx*COS(otilt),oy+ocx*SIN(                        |
| 400 PLOT 5,xr,yt:PLOT 5,xl,yt<br>410 PLOT 5,xl,yb                                                                     | 580 IF INKEY-23 K%=5:VDU7<br>590 IF INKEY-119 K%=85:VDU7                                                                                                                                                                                                                                                                         | 1720 FOR oy=0 TO cy STEP4<br>1730 ey=oy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | otilt) 2860 MOVE ox-ocy*COS(otilt+PI/2),oy-ocy                        |
| 420 ENDPROC<br>430 :                                                                                                  | 600 IF INKEY-120 K%=21:VDU7<br>610 IF INKEY-21 PROCair                                                                                                                                                                                                                                                                           | 1740 ex=cx/cy*SQR(cy*cy-ey*ey)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | *SIN(otilt+PI/2)                                                      |
| 440 DEF PROCdraw                                                                                                      | 620 PROCspeed                                                                                                                                                                                                                                                                                                                    | 1750 PLOT 4,ox,oy:PLOTK%,ex,ey<br>1760 PLOT 4,ox,-oy:PLOTK%,ex,-ey                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2870 DRAW ox+ocy*COS(otilt+PI/2),oy+ocy<br>*SIN(otilt+PI/2)           |
| 450 IF in%<1 ENDPROC<br>460 ?&19FF=in%:?&1AFF=N%                                                                      | 630 IF INKEY-100 V%=NOT(V%)<br>640 IF INKEY-85 H%=NOT(H%)                                                                                                                                                                                                                                                                        | 1770 PLOT 4,-ox,oy:PLOTK%,-ex,ey<br>1780 PLOT 4,-ox,-oy:PLOTK%,-ex,-ey                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 288Ø ENDPROC<br>289Ø :                                                |
| 470 CALL &1500<br>480 ENDPROC                                                                                         | 650 PROCcm<br>660 IF INKEY-24 D%=4:VDU7                                                                                                                                                                                                                                                                                          | 1790 oy=ey:ox=ex<br>1800 NEXT oy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2900 DEF PROCBE<br>2910 PROCBEGIN                                     |
| 490 :                                                                                                                 | 670 IF INKEY-88 D%=8:VDU7                                                                                                                                                                                                                                                                                                        | 1810 VDU 29,0;0;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2920 REPEAT                                                           |
| 500 DEF PROCID<br>510 PRINTTAB(2,1); "LOADING FILES"                                                                  | 680 IF INKEY-73 D%=16:VDU7<br>690 IF INKEY-103 AND cx>0 cx=cx-4                                                                                                                                                                                                                                                                  | 1820 ENDPROC<br>1830 :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2930 PROCcalc:PROCelcur<br>2940 IF INKEY-99 ang=ang+PI/10             |
| 520 PROCin:IF fn\$="" ENDPROC<br>530 VDU 28,0,4,39,4                                                                  | 700 IF INKEY-104 cx=cx+4 710 IF INKEY-98 AND cy>0 cy=cy-4                                                                                                                                                                                                                                                                        | 1840 DEF PROCspeed<br>1850 IP INKEY-89 D%=D%+4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2950 IF ang>PI*2+st ang=ang-PI*2<br>2960 PROCelcur                    |
| 540 PROCoscli("LOAD "+fn\$)                                                                                           | 720 IF INKEY-66 cy=cy+4                                                                                                                                                                                                                                                                                                          | 1860 IF INKEY-24 D%=4:VDU7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2970 UNTIL INKEY-74                                                   |
| 550 in%=?&19FP:N%=?&1AFF<br>560 RESTORE 920                                                                           | 730 IF INKEY-102 S%=-1:VDU7 740 IF INKEY-86 R%=-1:VDU7                                                                                                                                                                                                                                                                           | 1870 IF INKEY-88 D%=8:VDU7<br>1880 IF INKEY-73 D%=16:VDU7                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2980 VDU 7<br>2990 ENDPROC                                            |
| 570 FOR F%=3 TO 0 STEP-1<br>580 READ ad%                                                                              | 750 *FX 202,32                                                                                                                                                                                                                                                                                                                   | 1890 IF INKEY-57 AND D%>4 D%=D%-4<br>1900 ENDPROC                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 3000 :<br>3010 DEF PROCelcur                                          |
| 590 st%=&1B00+(N%+1)*F%                                                                                               | 770 :                                                                                                                                                                                                                                                                                                                            | 1910 :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 3020 MOVE x-12, y: DRAW x+12, y                                       |
| 600 FOR T%=0 TO N%<br>610 ad%?T%=at%?T%                                                                               | 780 DEF PROCcur<br>790 GCOL3,3                                                                                                                                                                                                                                                                                                   | 1920 DEF PROCCM<br>1930 IF INKEY-58 Y%=Y%+D%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3030 MOVE x,y-12:DRAW x,y+12<br>3040 ENDPROC                          |
| 620 NEXT T%<br>630 NEXT F%                                                                                            | 800 FOR Q%=1 TO2:*FX19<br>810 IF L% MOVE A%, B%: DRAW X%, Y%: GOTO87                                                                                                                                                                                                                                                             | 1940 IF INKEY-42 Y%=Y%-D%<br>1950 IF INKEY-26 X%=X%-D%                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 3050 :<br>3060 DEF PROCETY                                            |
| 640 VDU 28,0,31,39,0<br>650 ENDPROC                                                                                   | 0                                                                                                                                                                                                                                                                                                                                | 1960 IF INKEY-122 X%=X%+D%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 3070 IF ERR=17 Z%=1 ELSE PROCms(1, "CHEC                              |
| 660 :                                                                                                                 | 820 MOVE X%-12,Y%:DRAW X%+12,Y%:MOVE X %,Y%-12:DRAW X%,Y%+12                                                                                                                                                                                                                                                                     | 1970 ENDPROC<br>1980 :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | K DISC : PRESS KEY TO CONTINUE*) 3080 PROCEASE                        |
| 670 DEF PROCEAVE<br>680 IF M%>0 AND M%<3 U%=&3C80:W%=&8000                                                            | 830 PLOT 69, X%+cx, Y%+cy<br>840 PLOT 69, X%+cx, Y%-cy                                                                                                                                                                                                                                                                           | 1990 DEF PROCEAVE<br>2000 *SAVE WF FFFF3C80 FFFF7D80                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 3000 PROChase<br>3090 ENDPROC<br>3100 :                               |
| 680 IF M%>0 AND M%<3 U%=£3C80:W%=£8000<br>690 IF M%>3 AND M%<6 U%=£5800:W%=£8000<br>700 PRINTTAB(2,1);"SAVING SCREEN" | 850 PLOT 69, X%-cx, Y%-cy                                                                                                                                                                                                                                                                                                        | 2010 ENDPROC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3110 DEF PROCEASE                                                     |
| 710 PROCin                                                                                                            | 860 PLOT 69, X%-cx, Y%+cy<br>870 IF V% MOVE X%, 0:DRAW X%, 880                                                                                                                                                                                                                                                                   | 2030 DEF PROCload                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 3130 PLOT 4,0,0:PLOT 4,0,28                                           |
| 720 PROCOBCli("SAVE "+fn\$+" "+STR\$~U%+ " "+STR\$~W%)                                                                | 880 IF H% MOVE 0,Y%:DRAW 1279,Y%<br>890 NEXT Q%                                                                                                                                                                                                                                                                                  | 2040 *LOAD WF FFFF3C80<br>2050 ENDPROC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 3140 PLOT 87,1270,28<br>3150 PLOT 4,1270,0:PLOT 87,0,0                |
| 73Ø ENDPROC                                                                                                           | 900 GCOL 0,C%                                                                                                                                                                                                                                                                                                                    | 2060 :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 3160 MOVE 0,28:DRAW 1280,28                                           |
| 740 :<br>750 DEF PROCin                                                                                               | 910 ENDPROC<br>920 :                                                                                                                                                                                                                                                                                                             | 2080 LOCAL X%, Y%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 3180 GCOL 3,C%                                                        |
| 750 DEP PROCIN 760 PRINTAB(2,4); STRING\$(36,* ") 770 PRINTAB(2,2); "PICTURE'S NAME" 780 INPUTAB(2,4); fn\$           | 930 DEF PROCcheck<br>940 IF Y%>880 Y%=32                                                                                                                                                                                                                                                                                         | 2090 FOR Q%=0 TO 27<br>2100 X%=16+90*(0% MOD 14)                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 3190 ENDPROC                                                          |
| 780 INPUTTAB(2,4);fn\$ 790 ENDPROC                                                                                    | 950 IF Y%<32 Y%=880                                                                                                                                                                                                                                                                                                              | 2110 Y%=878+72*(Q% DIV 14)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 3210 DEF PROCms(W%, mes\$)                                            |
| 800 :                                                                                                                 | 960 IF X*0 X*=1270 970 IF X*20 X*=1270 X*=0 980 EMDPROC 990: 1000 DEP PROCEQT 1010 MOVE X*-cx, Y*-cy:MOVE X*-cx, Y*-cy 1020 FLOT X*, X*-cx, Y*+cy 1030 FLOT X*, X*-cx, Y*-cy 1040 FLOT X*, X*-cx, Y*-cy 1050 FLOT X* | 1980 : 1990 DEF PROCBAVE 1990 DEF PROCBAVE 2000 *SAVE WF FFFF3C80 FFFF7D80 2010 ENDPROC 2020 : 2030 DEF PROCLOAD 2050 ENDPROC 2060 : 2070 DEF PROCMENU 2080 LOCAL X%, Y% 2090 FOR Q%—20 TO 27 2100 X%—16+90*(Q% MOD 14) 2110 Y%—278+72*(Q% DIV 14) 2120 COCO 0, 3 2130 MOVE X%, Y% 2140 PLOF 1,0,60:PLOT1,66,0 2150 PLOT 1,0,60:PLOT1,66,0 2150 PLOT 1,0,60:PLOT1,66,0 2150 PLOT 1,0,60:PLOT1,766,0 2150 PLOT 1,0,740:PLOT1,766,0 2150 PLOT 1,0,740:PLOT1,740,0 2160 X%—X%+33:Y%—Y%+30 2170 CALL COLFI11, X%, Y%, Q% 2180 NEXT | 3230 PRINT;mes\$                                                      |
| 810 DEF PROCtop<br>820 FOR T%=1 TO 2                                                                                  | 980 ENDPROC<br>990 :                                                                                                                                                                                                                                                                                                             | 2140 PLOT 1,0,60:PLOT1,66,0<br>2150 PLOT 1,0,-60:PLOT1,-66,0                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 3240 VDU 24,0;32;1279;860;<br>3250 IF W% THEN REPEAT UNTIL GET        |
| 830 PRINTTAB(1,T%);STRING\$(38," ")<br>840 NEXT T%                                                                    | 1000 DEF PROCEQT                                                                                                                                                                                                                                                                                                                 | 2160 X%=X%+33:Y%=Y%+30                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 326Ø ENDPROC                                                          |
| 850 ENDPROC                                                                                                           | 1020 PLOT K%, X%-Cx, Y%+Cy                                                                                                                                                                                                                                                                                                       | 2180 NEXT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 3270 :<br>3280 DEF PROCdel(de)                                        |
| 860 :<br>870 DEF PROCoscli(\$cli%)                                                                                    | 1030 PLOT K%, X%+cx, Y%+cy<br>1040 PLOT K%, X%+cx, Y%-cy                                                                                                                                                                                                                                                                         | 2190 GCOL0,3:MOVE 0,866:DRAW 1270,866<br>2200 DRAW 1270,1022:DRAW 0,1022                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 3290 TIME=0:REPEAT UNTIL TIME=de<br>3300 ENDPROC                      |
| 880 X%=cli%;Y%=cli%DIV256<br>890 CALL &FFF7                                                                           | 1050 PLOT K%, X%-CX, Y%-CY<br>1060 ENDPROC                                                                                                                                                                                                                                                                                       | 2210 DRAW 0,866:PROCbase<br>2220 ENDPROC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 3310 :<br>3320 DEF PROCair                                            |
| 900 ENDPROC                                                                                                           | 1070 :                                                                                                                                                                                                                                                                                                                           | 2230 :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 3330 FOR 1%=Y%-cy TO Y%+cy STEP D%                                    |
| 910 :<br>920 DATA yh%,yl%,xh%,xl%                                                                                     | 1080 DEF PROCmix<br>1090 PROCget                                                                                                                                                                                                                                                                                                 | 2240 DEF PROCellipse<br>2250 GCOL3,3:F%=FALSE:G%=FALSE:C%=3                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 3340 FOR j%=X%-cx TO X%+cx STEP D%<br>3350 IF RND(10)<5 PLOT 69,j%,i% |
| Listing 4                                                                                                             | 1090 PROCget<br>1100 VDU 7<br>1110 T%=(X%-4)DIV 90+(Y%-864)DIV 80*14                                                                                                                                                                                                                                                             | 2260 PROCms(0,"ELLIPSE")<br>2270 be=0:end=2*PI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 3360 NEXT,:ENDPROC<br>3370:                                           |
|                                                                                                                       | 1120 IF T%=0 C%=3                                                                                                                                                                                                                                                                                                                | 228Ø ex=X%:ey=Y%:ecx=cx:ecy=cy:etilt=ti                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 3380 DEF PROCdist                                                     |
| 10 REM >SuperPa (Po84)<br>20 REM By Jon Baldwin                                                                       | 1130 IF T%=4 C%=1<br>1140 IF T%=8 C%=2                                                                                                                                                                                                                                                                                           | 1t<br>2290 REPEAT                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 3390 IF NOT INKEY-1 A%=X%:B%=Y%:ENDPROC 3400 PROCsavename             |

# PAGES YELLOW

| → 3410 ENDPROC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 640 LDY #1                                             | 1830 DEY                            | 3020 LDY tmp                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 3420 :<br>3430 DEF FNinpname                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 650 .xerror<br>660 LDA (mem),Y                         | 1840 BNE names<br>1850 LDY #8       | 3030 LDA #8<br>3040 STA count                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 3440 REPEAT<br>3450 PROCclearbase                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 670 STA err,Y<br>680 INY                               | 1860 JSR spcs<br>1870 LDA tmp       | 3050 .cloop<br>3060 LDA index,X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 3460 VDU 26                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 690 CMP #0                                             | 1880 CLC<br>1890 ADC #16            | 3070 BEQ gotind<br>3080 LDA (ptr),Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 3470 MOVE 5,24 3480 INPUT Filename : "file\$ 3490 UNTIL LEN(file\$)>0 AND LEN(file\$) <                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 700 BNE Xerror<br>710 LDA #0                           | 1900 STA tmp                        | The same of the sa |
| 3490 UNTIL LEN(file\$)>0 AND LEN(file\$)<                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 720 STA err<br>730 JMP err                             | 1910 BCC hloop<br>1920 .hdone       | 3100 CMP index,X<br>3110 BNE nextind                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 3500 PROCclearbase                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 740 :<br>750 .mess                                     | 1930 LDA #&86<br>1940 JSR osbyte    | 3120 INY<br>3130 INX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 3510 VDU 24,0;32;1279;860;<br>3520 =file\$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 760 STX mem                                            | 1950 CPX #0                         | 3140 DEC count                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 3530 :<br>3540 DEF PROCclearbase                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 770 STY mem+1<br>780 LDY #&FF                          | 1960 BEQ nomore<br>1970 JSR osnewl  | 3150 BNE cloop<br>3160 .gotind                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 3550 VDU 24,0;0;1279;24;<br>3560 GCOL 0,128:CLG                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 790 .pmess<br>800 INY                                  | 1980 .nomore<br>1990 JMP out        | 3170 LDA (ptr),Y<br>3180 CMP #32                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 3570 VDU 24,0;32;1279;860;                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 810 LDA (mem),Y                                        | 2000 :                              | 3190 BEQ indok                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 358Ø ENDPROC<br>359Ø :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 820 JSR osasci<br>830 BNE pmess                        | 2010 .nameonly<br>2020 JSR osnewl   | 3200 CMP #13<br>3210 BEQ indok                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 3600 DEF PROCSavename<br>3610 PROCoscli("SAVE "+FNinpname+" FFFF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 840 RTS                                                | 2030 LDY #&FF<br>2040 .pname        | 3220 .nextind<br>3230 LDA ind                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 3C8Ø FFFF7D8Ø")<br>362Ø ENDPROC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 850 :<br>860 .loadzero<br>870 LDX #5                   | 2050 INY<br>2060 LDA title,Y        | 3240 CLC<br>3250 ADC #16                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 3630 DEF PROCloadname                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 880 .lzero                                             | 2070 JSR oswrch                     | 3260 STA ind                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 3640 PROCoscli("LOAD "+FNinpname+" FFFF<br>3C80")                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 890 LDA zero,X<br>900 STA ext,X                        | 2080 BNE pname<br>2090 JSR osnewl   | 3270 BCC chkind<br>3280 .none                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 365Ø ENDPROC<br>366Ø :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 910 DEX<br>920 BPL lzero                               | 2100 RTS<br>2110 :                  | 3290 JMP out<br>3300 .indok                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 224 244                                                | 2120 .spcs<br>2130 LDA #32          | 3310 LDX ind<br>3320 LDA index+8,X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 3690 X%=oscli%:Y%=oscli% DIV 256                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 950 LDX #5                                             | 2140 .spcsl                         | 3330 STA from                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 3700 CALL &FFF7:ENDPROC<br>3710:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 960 .szero<br>970 LDA ext.X                            | 2150 JSR oswrch<br>2160 DEY         | 3340 LDA index+9,X<br>3350 STA from+1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 3720 DEF PROCprinter                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 980 STA zero,X                                         | 2170 BNE spcsl<br>2180 RTS          | 3360 LDA index+10,X<br>3370 STA to                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 3670 DEF PROCOSCII(SOSCII%) 3680 AN-OSCIÄ-1%-SOSCIÄ-DIV 256 3700 CALL EFFF7:ENDPROC 3710: 3720 DEF PROCPrinter 3730 REM Here is a screen dump for 3740 REM Epson type printers. Insert 3750 REM your own routine if necessary 3750:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1000 BPL szero                                         | 2190 :                              | 3380 LDA index+11,X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 3750 REM your own routine if necessary<br>3760:                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1010 RTS<br>1020 :                                     | 2200 .bmove<br>2210 LDY #0          | 3390 STA to+1<br>3400 LDA index+14,X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 3770 80420,0.400 23,0,0,2,1,2,1,1,03,170                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1030 .hex<br>1040 PHA                                  | 2220 .move<br>2230 LDA len          | 3410 STA len<br>3420 LDA index+15,X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                        | 2240 ORA len+1<br>2250 BEO bmoved   | 3430 STA len+1<br>3440 JSR bmove                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 3790 VDU 1,27,1,76,1,192,1,3 3800 FOR x*=0 TO 1276 STEP4:A%=0:B%=0 3810 FOR z*=0 TO 12 STEP4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1070 LSR A                                             | 2260 LDA (from),Y                   | 3450 LDA index+12,X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 3810 FOR z%=0 TO 12 STEP4<br>3820 A%=A%*4+3*POINT(x%,y%-z%)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1080 LSR A<br>1090 JSR dig                             | 2270 STA (to),Y<br>2280 INC from    | 3460 STA jsr+1<br>3470 LDA index+13,X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 3810 FOR THE TO 12 STRP 3820 A%=A%*4.9*FOINT(X%,Y=Z%) 3830 B%=B%*4.9*FOINT(X%+2,Y\$-Z%) 3840 MEXT:VDUI,A%,I,A%,I,B%:MEXT 3850 VDU 1,10:MEXT:VDU 1,27,1,64,3 3860 ENDPROC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1100 PLA                                               | 2290 BNE notfhi<br>2300 INC from+1  | 3480 STA jsr+2<br>3490 LDA ptr                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 3850 VDU 1,10:NEXT:VDU 1,27,1,64,3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1120 .dig                                              | 2310 .notfhi                        | 3500 STA optr                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 1140 BCC isnum                                         | 2320 INC to<br>2330 BNE notthi      | 3510 LDA ptr+1<br>3520 STA optr+1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Listing 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1150 CLC<br>1160 ADC #7                                | 2340 INC to+1<br>2350 .notthi       | 3530 LDY #0<br>3540 .moveptr                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 10 REM >AutoSource (Po85)<br>20 REM By David Lawrence                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1170 ignum                                             | 2360 DEC len<br>2370 LDA len        | 3550 INC ptr<br>3560 BNE notphi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 30 REM For BBC B/B+/M/C/E with SWR                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1180 ADC #48<br>1190 JMF oswrch<br>1200 :              | 2380 CMP #&FF                       | 3570 INC ptr+1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 40 REM (C) BAU January 1992 & March 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1200 :<br>1210 .help                                   | 2390 BNE move<br>2400 DEC len+1     | 3580 .notphi<br>3590 LDA (ptr),Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 50 :<br>60 PROCVATS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 1220 TXA<br>1230 PHA                                   | 2410 LDA len+1<br>2420 CMP #&FF     | 3600 CMP #ASC"*"<br>3610 BEQ moveptr                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 70 PROCASS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1240 TYA<br>1250 PHA                                   | 2430 BNE move<br>2440 .bmoved       | 3620 CMP #ASC" "<br>3630 BEQ moveptr                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 80 PROCcheck 90 PRINTCHR\$13; "Checked O.K." '"Saving                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1260 JSR savezero                                      | 2450 RTS                            | 3640 JSR loadzero                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 100 OSCLI"*SAVE Autorom "+STR\$"code+"                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1270 LDA (ptr),Y<br>1280 CMP #13                       | 2460 :<br>2470 .starcom             | 3650 PLA<br>3660 TAY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| "+STR\$"0%+" 8000 8000"<br>110 END                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1290 BEQ nonly<br>1300 LDX #&FF                        | 2480 TXA<br>2490 PHA                | 367Ø STY Y<br>368Ø PLA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 120 :<br>130 DEF PROCVATS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1310 DEY<br>1320 .help1                                | 2500 TYA<br>2510 PHA                | 3690 TAX<br>3700 STX x                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 140 DIM code 2000                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 1330 INX                                               | 2520 JSR savezero                   | 3710 PLA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 150 cr\$=CHR\$13<br>160 z\$=CHR\$0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1340 INY<br>1350 LDA hword,X                           | 253Ø LDX #Ø<br>254Ø STY tmp         | 3720 STA a<br>3730 PLA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 170 mem=&70:ext=&70<br>180 len=&70:from=&72                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1360 CMP #13<br>1370 BEQ bighelp                       | 2550 .com1<br>2560 LDA coms,X       | 3740 STA p<br>3750 PHA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 190 to=£74:ptr=£F2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1380 LDA (ptr),Y                                       | 2570 CMP #255                       | 3760 LDA a                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 210 fname=&112:index=&8800                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1400 BEQ bighelp                                       | 259Ø LDY tmp                        | 378Ø .jsr                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 220 store=&8900<br>230 oswrch=&FFEE:osnewl=&FFE7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1410 AND #EDF<br>1420 CMP hword, X                     | 2610 LDA coms,X                     | 3800 LDA optr                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 240 osasci=&FFE3:osbyte=&FFF4 250 osfile=&FFDD:osargs=&FFDA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 1430 BEQ help1<br>1440 .out                            | 2620 BEQ gotcom<br>2630 LDA (ptr),Y | 3810 STA ptr<br>3820 LDA optr+1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 260 osfind=&FFCE:oscli =&FFF7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1450 JSR loadzero                                      | 2640 AND #ADF                       | 3830 STA ptr+1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 280 :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1470 TAY                                               | 2660 BNE nextone                    | 385Ø LDY Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 300 FOR pass=4 TO 6 STEP 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1490 TAX                                               | 2680 INX                            | 3870 PHA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 310 P%=68000:0%=code<br>320 IOPT pass                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1500 PLA<br>1510 PLP                                   | 2690 BNE com2<br>2700 .nextone      | 3880 LDA #0<br>3890 PLP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 330 .start                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1520 RTS                                               | 2710 INX<br>2720 IDA coma X         | 3900 RTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 350 RTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1540 JSR nameonly                                      | 2730 BNE nextone                    | 3920 .comout                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 360 RTS<br>370 JMP service                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1560 :                                                 | 2750 INX                            | 3940 PLA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 380 EQUB 129<br>390 EQUB CODY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 1570 .bighelp<br>1580 JSR nameonly                     | 2760 INX<br>2770 BNE com1           | 3950 TAX<br>3960 PLA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 460 EQUB 1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1590 LDX #hlptxt MOD 256                               | 2780 .gotcom<br>2790 INX            | 3970 TAX<br>3980 PLA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 420 EQUS "Autorom 1.0"+z\$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1610 JSR mess                                          | 2800 LDA coms,X                     | 3990 LDA #0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 440 EQUS z\$+"(C) Acorn User 1988"+z\$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 1630 BEQ nomore                                        | 2820 LDA coms+1,X                   | 4010 RTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 450 :<br>460 .service                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 1640 LDX #fcached MOD 256<br>1650 LDY #fcached DIV 256 | 283Ø STA mem+1<br>284Ø .movey       | 4020 :<br>4030 .clear                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 470 PHP<br>480 PHA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1660 JSR mess<br>1670 LDX #0                           | 2850 LDA (ptr),Y<br>2860 CMP #13    | 4040 CMP #13<br>4050 BNE notclr                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 490 CMP #9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1680 STX tmp                                           | 287Ø BEQ ymoved                     | 4060 LDY #0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 510 JMP help                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1700 LDX tmp                                           | 289Ø CMP #32                        | 4080 .clrind                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 520 .not9<br>530 CMP #4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 1710 LDA index,X<br>1720 BEQ hdone                     | 2900 BEQ movey<br>2910 DEY          | 4090 STA index,Y<br>4100 DEY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 540 BNE not4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 1730 LDY #4<br>1740 JSR spcs                           | 2920 .ymoved<br>2930 .JMP (mem)     | 4110 BNE clrind<br>4120 LDX #store MOD 256                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 560 not4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 1750 LDY #8                                            | 2940 :                              | 4130 STX mem                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 570 PLA<br>580 PLP                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 1770 LDA index,X                                       | 2960 LDX #0                         | 4150 LDX #store DIV 256                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 590 RTS<br>600 :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1780 BNE notend<br>1790 LDA #32                        | 2970 STX ind<br>2980 .chkind        | 4160 STX mem+1<br>4170 STX index+9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 610 .error<br>620 STX mem                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | 1800 .notend<br>1810 JSR oswrch                        | 2990 LDX ind<br>3000 LDA index.X    | 4180 LDA #&CØ<br>4190 SEC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 160 z\$=CHR\$0 170 memax70:cxt=x70 180 len=x70:from=x72 130 to=x70:from=x72 130 to=x70:from=x72 130 to=x70:from=x72 130 to=x70:from=x72 130 fname=x12:infoc=x8800 210 store=x8900 210 store=x8900 210 store=x8900 210 store=x8900 210 store=x8900 210 store=x8900 210 cstore=x8900 210 c | 1820 INX                                               | 3010 BEQ none                       | 4200 SBC mem+1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| The state of the s   |                                                        |                                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |

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6590 CPX #8
6600 BNE scrap1
6610 JNP nofile
6620 .ecc
6630 LDX #0
6640 STX tmp
6650 .fscrap
6660 LDX tmp
6660 LDX tmp
6670 LDA index,X
6600 BSQ notthere
6690 LDY #0
6700 LDA #8
6710 STA count
6720 .comploop
                                                                                                                                                                                                                                                                                                                                                                           5400 .toobig
5410 LDX #ftb MOD 256
5420 LDY #ftb DIV 256
5430 JMP error
5440 .nofile
5450 LDX #fnf MOD 256
5460 LDY #fnf DIV 256
5470 JMP error
5480 .noroom
5490 LDX #nis MOD 256
5500 LDY #nis DIV 256
5500 LDY #nis DIV 256
    4210 STA memfree+1
4220 LDA #0
4230 STA iptr
4240 STA num
4250 STA memfree
4260 JMP comout
4270 notcly
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7790 BNE deloop
7800 JMP comout
7810 :
7820 .hlptxt E
7830 E
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.hlptxt EQUS *
EQUS *
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*CACHE <file>"+
        4270 .notclr
4280 JMP out
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    4290 :
4290 :
4300 .data
4310 CMP #13
4320 BNE notclr
4330 LDA index
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              cr$
7850
7860
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*DATA"+cr$
                                                                                                                                                                                                                                                                                                                                                                                  5510 JMP error
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         7870 EQUB Ø
7880 .fcached EQUS "
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                                                                                                                                                                                                                                                                                                                                                                                  5520 :
5530 .ok
                                                                                                                                                                                                                                                                                                                                                                           5530 .ok
5540 LDY #£11
5550 LDA #&FF
5560 .clrblk
5570 STA finfo, Y
5580 BPY
5590 RNE clrblk
5600 LDA #fname MOD 256
5610 STA finfo
5620 LDA #fname DIV 256
5630 LDA #fname DIV 256
5630 LDA #fname DIV 256
5640 LDX #finfo MD 256
5640 LDX #finfo DIV 256
5650 LDA #&FF
5670 JSR osfile
5690 LDY #finfo DIV 256
5680 LDY #finfo DIV 257
5790 STA from
5710 STA from
5710 STA fnom
5710 STA 
        4340 BEQ sdone
4350 LDX #dhead MOD 256
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           6720 .comploop
6730 LDA index,X
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                $+z$
7890 .dhead EQUS "Filename Load Exe
4350 LDX #dhead MOD 256
4360 LDY #dhead DIV 256
4370 JSR mess
4380 LDX #0
4390 STX tmp
4400 snames
4410 LDX tmp
4420 LDA index, X
4430 BRC sdone
4440 LDY #8
4450 dloop
4460 LDA index, X
4470 BNE nospc
4480 LDA #32
4490 LDA #32
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         6730 LDA index,X
6740 BEQ comped
6750 CMP fname,Y
6760 BNE ncomp
6770 INX
6780 INY
6790 DEC count
6800 BNE comploop
6810 .notthere
6820 JMP nofile
6830 E
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EQUS " bytes free."+cr$+z
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         7910 .fnf
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                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           6830 :
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         0839 :
6840 .ncomp
6850 LDA tmp
6860 CLC
6870 ADC #16
6880 STA tmp
6890 BCC fscrap
6990 JMP nofile
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         7950 .ssyn BRK:
*SCRAP <file>"+z$
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EQUS "AUTOROM"+cr$
EQUS "CACHE"+z$ : EQUW ca
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7970 .coms
      4490 .nospc
4500 JSR oswrch
                                                                                                                                                                                                                                                                                                                                                                           5700 STA from
5710 STA index+10,Y
5720 LDA finfo+3
5730 STA from+1
5740 STA index+11,Y
5750 LDA index+9,Y
5750 STA to
5770 LDA index+9,Y
5790 STA to+1
5790 LDA finfo+6
5800 STA index+12,Y
5810 LDA finfo+7
5820 STA index+13,Y
5830 LDA ext
5840 STA index+14,Y
5850 LDA ext+14,Y
5850 LDA ext+14,Y
      4510 INX
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7980
  4520 DEY
4530 BNE dloop
4540 LDA tmp
4550 CLC
4560 ADC #10
4570 PHA
4580 TAY
4590 JSR pdata
4600 INY
4610 INY
4620 JSR pdata
4631 INY
4640 INY
4650 JSR pdata
4670 TAY
4680 DEY
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     6900 JMP nofile
6910 .comped
6911 .comped
6920 LDA fname, Y
6930 CMP #32
6940 BBG compok
6950 CMP #13
6960 BNE ncomp
6970:
6960 EDX tmp
7000 LDA index+14, X
7010 S7A len
7021 LDA index+15, X
7031 STA len+1
7040 CPX #AP0
7050 BBG justdel
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     EQUS "SCRAP"+z$ : EQUW sc
      452Ø DEY
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8010
8020 .zero
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EQUD Ø
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8070 .num
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5860 STA index+15,Y
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   7050 BEQ justdel
7060 LDA index+8, X
7070 STA to
7080 BEQ justdel
7080 LDA index+9, X
7090 STA to
7110 STA from
7120 LDA index+24, X
7130 STA from+1
7140 LDY 80
7150 .shuffle
7160 LDA (from), Y
7170 STA (to), Y
7180 INC to
7190 BNE shuffle
7240 INC from+1
7250 LDA from+1
725
                                                                                                                                                                                                                                                                                                                                                                         5870 LDA memfree

5880 SEC

5890 SEC len

5900 STA memfree

5910 LDA memfree+1

5920 SEC len+1

5930 STA memfree+1

5930 STA memfree+1

5940 JSR bmove

5950 Jfret

5970 INX

5980 LDA fname,X

5980 LDA fname,X

5980 LDA fname,X

6000 BEQ ndot

6010 CMP #13

6020 BNE fret

6030 ndot
                                                                                                                                                                                                                                                                                                                                                                                  5870 LDA memfree
4880 BEY
4780 JSR pdata
4710 JSR osnew1
4710 JSR osnew1
4720 LDA tmp
4730 CLC
4740 ADC #16
4750 STA tmp
4760 BCC snames
4770 .ddone
4780 LDA #ASC's"
4790 JSR oswrch
4880 LDA memfree+1
4810 JSR hex
4820 LDA memfree
4830 JSR hex
4840 LDX #dfoot MOD 256
4850 JSR mess
4870 JMP comout
4880 :
      469Ø DEY
                                                                                                                                                                                                                                                                                                                                                                           6020 BNE fret
6030 .ndot
6040 DEX
6050 BEQ gotit
6050 BEQ gotit
6060 LDA fname, X
6070 CNP #ASC*.*
6080 BNE ndot
6080 BNE ndot
6080 INX
6100 .gotit
6110 LDY #8
6120 STY tmp
6130 LDY iptr
6140 .mmame
6150 LDA fname, X
6160 CMP #32
6170 BEQ mndone
6180 EMP #13
4880 : 4880 : 4880 : 4880 : 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 9482 | 94
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         3310 :
8320 DEF PROCSUM(S$,E$,N%)
8330 T%=0
8340 FOR I%=EVAL(S$)-P%+O% TO EVAL(E$)-
    4880
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            Sale For Teachalds; Pertur To Eval(8)-
Pertur 3350 T%=T%+?1%:NEXT
8360 IF T%=T%-RNDPROC
8370 PRINT "Please check from ";S$;" to
";E$;"."
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              Listing 6
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   10 REM >StarCheck (Po86)
20 REM By David Lawrence
30 REM For BBC B/B+/M/C/E
40 REM (C) BAU January 1992 & March 1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     7398 BNE shufind
7398 LDX tmp
7408 .sublen
7418 LDA index+8, X
7428 SEC
7430 SBC len
7448 STA index+9, X
7459 LDA index+9, X
7459 SDC len+1
7478 STA index+9, X
7489 TXA
7490 CLC
7500 ADC #16
7510 TAX
7520 BCC sublen
7530 LDA num
                                                                                                                                                                                                                                                                                                                                                                               619Ø BEQ mndone
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           7380 BNE shufind
                                                                                                                                                                                                                                                                                                                                                                               6200 STA index, Y
                                                                                                                                                                                                                                                                                                                                                                               621Ø INX
                                                                                                                                                                                                                                                                                                                                                                       6228 INT
6238 DEC tmp
6248 BNE mname
6250 .mndone
6268 LDA num
6270 CMP #15
6288 BEQ noinc
6298 LDA iptr
6308 CLC
6310 ADC #16
6320 STA iptr
6340 LDA tot
6350 STA index+8, Y
6360 LDA tot-1
6370 STA index+9, Y
6360 LDA tot-1
6370 STA index+9, Y
6360 LDA tot-1
6370 STA index+9, Y
6360 LDA tot-1
6370 STA index-9, Y
6380 .noinc
6391 INC num
6440 JMP comout
6410:
6420 .scrap
6430 LDX #80 MP #33
6440 BNE doscrap
6450 LDX #80yn MOD 256
6470 JMP error
6480 .doscrap
6490 LDX #80 MP #5500 .scrap1
6500 .scrap1
6500 .scrap1
6500 .scrap1
6500 .scrap1
6510 LDA (ptr), Y
6520 STA fname, X
6530 CMP #33
6540 BEQ eoc
6570 INY
6560 BEQ eoc
6570 INY
6580 BEQ eoc
6570 INY
                                                                                                                                                                                                                                                                                                                                                                               6220 INY
6230 DEC tmp
    5040 .docache
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          988
50:
60 PROCassemble
70 PRINT"Saving "Check..."
80 OSCLI"Save Check "+STR$"code+" "+S
TR$"C%+" 980 980"
90 END
    5050 LDX #0
5050 LDX #0
5050 .Xname
5070 LDA (ptr),Y
5080 STA fname,X
5090 HYX
5100 HX
5110 CMF #13
5120 BME xname
5130 LDX #fname MOD 256
5140 LDX #fname DIV 256
5150 LDA #440
5170 CMF #0
5180 BEQ nofile
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       RS OK+ 980 980*
90 END
100:
110 DEF PROCassemble
120 DIM code 256
130 PG PASSEMAT TO 6 STEP 2
140 P%=5900:0%=code
150 [OFT pass
150 .skipto
170 INY
180 LDA (&F2),Y
190 CMP #13
200 BEQ coc
210 CMP #32
220 BNE skipto
230 .skipover
240 INY
250 LDA (&F2),Y
250 CMP #33
270 BEQ coc
280 CMP #33
270 BEQ coc
280 CMP #32
290 BEQ skipover
290 BEQ skipover
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 7510 BCC sublen
7520 BCC sublen
7530 LDA num
7540 CMP #16
7550 BEQ justdel
7550 BEQ justdel
7560 LDA iptr
7570 SEC
7580 SBC #16
7590 STA iptr
7600 .justdel
7610 BCC num
7620 LDA memfree
7630 CLC
7640 ADC len
7650 STA memfree
7660 LDA memfree+1
7670 ADC len+1
7680 STA memfree+1
7690 LDA #0
7710 deloop
  5180 BEQ nofile
5190 TAY
    5200 LDX #ext
5210 LDA #2
5280 DA #25
5210 DA #2
5210 DA #2
5230 DA #3
5230 DA #3
5240 USR osfind
5250 DA num
5250 DA num
5260 CMP #16
5270 BBQ noroom
5280 DA ext+2
5290 ORA ext+2
5290 ORA ext+3
5300 SNE toohig
5310 LDA ext+1
5330 BCC Ck
5340 BNE toohig
5350 DAB ext
5350 DAB ext
5360 CMP memfree+1
5360 CMP memfree+1
5370 BEQ oCh
5380 BCC ok
5380 BCC ok
5390 ;
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             290 BEQ skipover
300 BNE notspc
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         771Ø
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             .deloop
CPY #&F8
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             330 EQUS "*CHECK <word>"
340 EQUB 13:BRK
350 .notspc
360 LDX #0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         7720
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         7730
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             BNE noiny
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         7740 INY
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         775Ø INY
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       7760 .noiny
7770 STA index,Y
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           370 .move
380 LDA (&F2),Y
```



```
390 STA word, X
400 INY:INX
410 CMP #13
420 BNE move
430 LDY #0
440 DEX
450 DEX
460 .compare
470 LDA word, X
480 CMP word, Y
490 BNE notsame
 510 DEX
 520 BNE compare
530 BRK:BRK
540 EQUS "Palindrome"
550 EQUB 13:BRK
```

```
560 .notsame
570 BRK:BRK
580 EQUS "Not Palindrome"
590 EQUB 13:BRK
600 RTS
610 .word
620 BRK
630 LUTY
620 BRK
630 | NEXT
640 T%=0
650 FOR 1%=code TO 0%-1
660 T%=T%+?1%
670 NEXT
 680 IF T%<>11553 PRINT "Checksum error
690 ENDPROC
```

860 DATA 0000000000007799FFFF/12 870 DATA FFFFFF000000700700000/86

880 DATA 000000000000077FFFFF/FA 890 DATA BFFF0F70770770070000/2C

#### Listing 7

```
10 REM >StarPhone (Po87)
20 REM By David Lawrence
30 REM For BBC B/B+/M/C/E
40 REM (C) BAU January 1992 & March 1
    60 DIM code 100
    70 mem%=code
80 FOR num%=1 TO 9
                                                                                                                                           220 RND
88 FOR num%=1 TO 9
9 READ hex, sum%
100 tot%=0
110 REPEAT
120 val%=EVAL("E"+LEFT$(hex$,2))
130 ?mem%=val%
140 mem%=mem%=1
150 tot%=tot%=val%
160 hex$=MID$(hex$,3)
```

```
170 UNTIL hex;=""
180 IF tot*<>sum* PRINT "Error in line
";num*:END
190 NEXT num* -
200 FRINT"Saving "Phone..."
210 OSCLI"Save Phone "+STR$"code+" "+S
TR$ Temm** 900 900"
           230 : 240 DATA A239A003A90820F1FFA905,1267
250 DATA 803809A247A009A90720F1,1057
260 DATA F7A24FA009A90720F1FFA2,1531
270 DATA 477A003A90720F1FFA2,1531
280 DATA 03A90720F1FFC23809D007,1407
290 DATA 600001019607A901010077,407
290 DATA 600001019607A901010077,407
310 DATA 000001010070A001010077,707
320 DATA 000000000003,35
```

#### **Sprite Editor**

```
Listing 1
        10 REM >MakeSprEd (SprED1)
20 REM by Ian Wilson
30 REM for Arc only
40 REM (c) BAU Jan 91
         60 ON ERROR PROCETTOT
     70:

80 *CDIR "!SprEd"

90 *DIR "!SprEd"

100 PROCdatafile("!Sprites",780,&FF9)

110 PROCdatafile("Templates",1550,&FEC
     120 PROCtextfile("!Boot",630,&FEB)
130 PROCtextfile("!Run",670,&FEB)
      140
                 *DIR
      150 END
      170 DEF PROCdatafile(fname$, restore%, t
      180 RESTORE restore%
     180 RESTORE restore%
190 acc%=0
200 line%=0
210 out%=OPENOUT fname$
220 REPEAT
230 line%==10
240 READ inp$
250 IF inp$<>"end" THEN
260 i%=1
     266 i%=1
270 REPEAT
280 byte%=EVAL("&"+HID$(inp$,i%,2))
290 BPUT# out%,byte%
300 i%+=2
      310 acc%+=bvte%
310 acc%+byte%
320 UNTIL MID$(inp$,i*,1)="/"
330 chec%=bYAL("%"+MID$(inp$,i*+1,2))
340 IF check*-bYAL("%"+MID$(inp$,i*+1,2))
340 IF check*-back MOD 256 THEN PRINT
'Checksum error at line "STR$(restore*+
line*-10): END
350 ENDIF
360 UNTIL inp$="end"
370 CLOSE# out*
380 STS "05 File",18, fname$, type%
390 ENDPROC
400:
      410 DEF PROCtextfile(fname$, restore%, t
      420 RESTORE restore
      430 out%=OPENOUT fname$
     440 REPEAT
450 READ inp$
460 IF inp$<> end* THEN
470 FOR i%= 1 TO LER(inp$)
480 BPUT# out*, ASC(MID$(inp$, i%, 1))
480 BPUT# out*, 10
510 ENDIF
520 UNTIL inp$= end*
530 CLOSS# out*
540 STB "OS_File", 18, fname$, type%
550 ENDPROC
560 :
      550 :
570 DEF PROCERTOR
580 PRINT REPORT$+" at line "STR$(ERL)
590 *DIR
      610 ENDPROC
      630 REM data for Boot File
640 DATA "IconSprites <Obey$Dir>.!SPRI
589 DATA "LOUBDITUES CONFINENT
TES"
550 DATA "end"
650:
570 REM data for Run File
680 DATA "|> IRun"
690 DATA "|> Run file for SprEd"
780 DATA "|By Ian Wilson @ BBC Acorn U
ser"
710 DADA "IF "<System$Path>"="" then e
/10 DADA "IF "KSystemSPath>"=" then e
rror 0 System resources not found"
720 DATA "RMENsure ColourTrans 0.00 RM
Load System:Modules.Colours"
730 DATA "Set SprEd$dir <0bey$Dir>"
740 DATA "Wimpslot -min 48k -max 48k"
750 DATA "chey$Dir>.!RunImage"
760 DATA "chey$Dir>.!RunImage"
770 DATA "end"
```

```
900 DATA 00000000000077FFFFFF/60
910 DATA BBBB0077720770070000/3D
1510 DATA ØØFØFFFFFFFFFFFFFF/BF
1520 DATA FFFFFFFFFFF/B9
1530 DATA end
```

```
1830 DATA 00C75655727369676E0D/90
1840 DATA 643E0D7FD0000000C0FF/4D
1850 DATA FFFF50020000F0FFFFF/8A
1860 DATA 3D600007537072455401
1870 DATA 6C65643E0D7FD0000000/E8
```

2800 DATA FF3D6000078A0D6E7469/51 2810 DATA 746C65643E0D7FC40300/8B 2820 DATA 0040FFFFFFF203000070/2D 3440 DATA 6105500150077720100/18
3450 DATA 6105500150077720100/18
3450 DATA 61055001500077720100/18
3450 DATA 60080787FFFTA010000808/71
3470 DATA FPFFFF1C5000073C556F/10
3490 DATA 7469746C656438007765/6
3490 DATA 02000054FFFFF196000753/2F
3510 DATA 020000027FFFF752050071
3520 DATA 020000027FFFF752050071
3520 DATA 020000027FFFF7530001/0
3530 DATA 020000027FFFF7530001/0
3530 DATA 020000027FFFF7530001/0
3540 DATA 7444800746746C6564/0
3550 DATA 30030736300303556F/6
3550 DATA 32000125566/38001176/F1
3590 DATA 020001255664638001176/F1
3590 DATA 020001255664638001176/F1
3610 DATA 0310011001100315566/F1
3620 DATA 7469746C6564380015556/F1
3630 DATA 645046746C6564380015556/F1
3630 DATA 7469746C6564380015556/F1
3630 DATA 645046746C6564380015556/F1
3630 DATA 645046746C6564380015556/F1
3630 DATA 645046746C656438001655/F1 Listing 2

```
10 REM > RunImage (SprED2)
20 REM by Ian Wilson
30 REM for Arc only
40 REM (c) BAU Jan 92
50 :
60 ON ERROR PROCETTOR
70 DIM q% £800
80 DIM block% £1000
90 DIM pointer% 64
```

```
2160 :
2170 DEF PROCMENUSELECT
2180 SYS "Wimp_GetFointerInfo",,q%
2190 IF q% 18-1 THEN remenu%=TRUE ELSE r
emenu%=PALSE
2200 CASE menuselect% OF
2210 WHEN menu%
2220 CASE 1block% OF
2230 WHEN 0 : IF heap% THEN
2240 PROClooseheap
2255 | q%=edit%
       100 DIM menu% 100, cmenu% 200
110 DIM useful% 100
120 DIM savename% 64
130 DIM tintpal% 64
140 DIM temppal% 256
150 DIM palette% 256
160 heap%=0:end%=FALSE
                                                                                                                                                   1898 menu%112=7:menu%713=2
1108 menu%114=7:menu%715=9
1110 menu%114=10:menu%120=44
1120 menu%124=0:menu%128=0
1130 menu%122=0:menu%136=£7000021
1140 %[menu%140]=Clear*+CHR$(8)
1150 menu%152=9
                                                                                                                                                                                                                                                                                                                                                                                                                                                3120 PROCinfosprite(1)
                                                                                                                                                                                                                                                                                                                                                                                                                                            3120 PROCinfosprite(1)
3130 PROCopen
3140 block%12=yourref%
3150 block%126=spritesin%+ext%
3170 block%124=12
3180 REN STS "Mimp_SendMessage",17,block%,124=12
3190 waitingfortransfer%=FALSE
3200 ENDPROC
3210 :
                                                                                                                                                   1150 menu%152=0
1160 menu%156=info%
1170 menu%160=&7000021
1180 $(menu%+64)="Info"+CHR$(0)
         170 sent%=FALSE:waitingfortransfer%=FA
       BE
180 quicksave%=0:xmantissa%=1
180 xdivisor%=1:ymantissa%=1
200 ydivisor%=1:xout%=1026
210 yout%=960:desktopcol%=3
220 spriteloaded%=PALSE
230 scraps="Wimp%Scraps"
240 newsprite%="Newsprite"
250 PROCinit:PROCpalette
250 PROCmini*:PROCfinish
260 :
                                                                                                                                                   1190 menu%176=&80
1200 menu%180=0
1210 menu%184=&7000021
1220 $(menu%+88)="Quit"+CHR$(0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                3210 :
3220 DEF PROCgetscrapfile
                                                                                                                                                                                                                                                                                                 2250 !q%=edit%
2260 SYS "Wimp_CloseWindow",,q%
                                                                                                                                                                                                                                                                                                 2270 spriteloaded%=FALSE
2280 ENDIF
                                                                                                                                                                                                                                                                                                                                                                                                                                                3230 !block%=64
3240 block%!12=yourref%
                                                                                                                                                                                                                                                                                                2290 WHEN 2 : end%=TRUE
2300 ENDCASE
                                                                                                                                                                                                                                                                                                                                                                                                                                                325Ø block%!16=2
                                                                                                                                                   1238 :
1248 $cmenu%="Colours"
1250 cmenu%?12=7:cmenu%?13=2
1260 cmenu%?14=7:cmenu%?13=0
1270 cmenu%16=340:cmenu%120=4
1280 cmenu%16=340:cmenu%120=0
1290 cmenu%124=0:cmenu%136=27000121
1300 DIM cmenu%140)="Desktop to actual*+C IRS(0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                3260 block%!36=-1
                                                                                                                                                                                                                                                                                                2300 BENCASE
2310 MEN cmenu%
2320 IF | block%-4 THEN
2330 cmenu%|124 cmenu%|124 EOR 1
2340 kpal%-kpal% EOR 1
2350 BENSE
2360 desktopcol%=|block%
2370 FOR 1%-0 TO 3
2360 %=18*24*24*28
2390 IF 1%=|block% THEN cmenu%|1%=1 ELS
R cmenu%|1%=1 ELS
R cmenu%|1%=1 ELS
                                                                                                                                                                                                                                                                                                                                                                                                                                               3270 $(block%+44)="<Wimp$Scrap>"+CHR$(0
                                                                                                                                                                                                                                                                                                                                                                                                                                                3280 SYS "Wimp_SendMessage", 18, block%, b
                                                                                                                                                                                                                                                                                                                                                                                                                                                ock%!4
3290 waitingfortransfer%=FALSE
3300 ENDPROC
3310 :
         290 DEF PROCMAIN
         300 REPEAT
         300 REPEAT
310 PROCPO11
320 UNTIL end%=TRUE
330 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                                                                                                 3320 DEF PROCgetloadname(load$)
                                                                                                                                                 HR$ (Ø)
                                                                                                                                                   1320 cmenu%|44=0:cmenu%|48=20
                                                                                                                                                                                                                                                                                                                                                                                                                                                3330 pathname$=load$
3340 IF INSTR(load$,"<Wimp$Scrap>")<1 T
                                                                                                                                                   1330 cmenu%!52=0:cmenu%!56=0
1340 cmenu%!60=&7000121
                                                                                                                                                                                                                                                                                              E cmenu%!j%=0
2400 IF i%=3 THEN cmenu%!j%+=2
         340 :
350 DEF PROCfinish
360 SYS "Wimp_CloseDown",task%,"TASK"
                                                                                                                                                                                                                                                                                                                                                                                                                                                3350 filein$=load$
                                                                                                                                                    1350 DIM cmenu%!64 20
                                                                                                                                                                                                                                                                                                                                                                                                                                                3360 fileout$=FNaddx(filein$,10)
3370 $loadnameaddr%=filein$+CHR$(0)
         370 END
380 ENDPROC
                                                                                                                                                   1360 $(cmenu%164)="Actual to desktop"+C
                                                                                                                                                                                                                                                                                                 2420 ENDCASE
                                                                                                                                               1360 $(cmenu%164)="Actual to desktop"+C
HR$(0)
1370 cmenu%168=0:cmenu%172=20
1380 cmenu%176=0:cmenu%180=0
1390 cmenu%184=27000121
1400 DIM cmenu%188 20
1410 $(cmenu%188)="Actual to actual"+CH
R$(0)
1420 cmenu%192=0:cmenu%196=20
1440 cmenu%1180=3:cmenu%196=20
1440 cmenu%1180=3:cmenu%1184=0
1440 cmenu%1180=3:cmenu%1184=0
1440 cmenu%1182=0
                                                                                                                                                                                                                                                                                             2420 ENDCASE
2430 ENDIF
2440 IF remenu% THEN SYS "Wimp_CreateMe nu", menuselect%
2450 ENDPROC
2460 :
2470 DEF PROCopen
2480 iq%=edit%
2490 SYS "Wimp_GetWindowState",,q%
2500 SYS "Wimp_CloseWindow",,q%
2510 SYS "Wimp_CloseWindow",,q%
2520 ENDPROC
2530 :
380 ENDPROC
390:
400 DEF PROCETOR
400 DEF PROCETOR
410 SYS "Wimp_ClaimFreeMemory",0
420 CASE ERR OF
430 MHEN 1800 :PROCEDIE OF ("Unsuitable sprite mode"): PROCMAIN: PROCEDIES
440 WHEN 67797 :PROCEDIEMOFf("Disc not present"): PROCMAIN: PROCEDIES
450 WHEN 17 :PROCEDIEMOFf("Sprite conversion aborted"): PROCMAIN: PROCEDIES
460 OPHERMISE
                                                                                                                                                                                                                                                                                                                                                                                                                                                338Ø $savenameaddr%=fileout$+CHR$(Ø)
                                                                                                                                                                                                                                                                                                                                                                                                                                           3390 KLSE
3400 $loadnameaddr%="<Untitled>"
3410 $savenameaddr%="<Untitled>"
3420 ENDIF
3430 ENDIFOCO
3440:
3450 DEF PROCloadsprite
3450 DEF PROCloadsprite
3460 IF heap% THEN PROClooseheap
3470 IF block%140<>aff9 THEN PROCtellem
off("Not a Sprite File"): ENDPROC
3480 in%-OPENIN pathname$
3490 ext%=(EXT# in%)+32
3500 CLOSE# in%
3510 $pointer%=pathname$+CHR$(0)
                                                                                                                                                                                                                                                                                                                                                                                                                                                339Ø ELSE
                                                                                                                                                    1450 DIM cmenu%!112 20
         460 OTHERWISE
                                                                                                                                                    1460 $(cmenu%!112)="Desktop to desktop"
                                                                                                                                                                                                                                                                                                  2540 DEF PROCalterratio(icon%,inc%)
         470 !block%=ERR
                                                                                                                                                                                                                                                                                             2540 DEF PROCALterratio(icon%, inc%)
2558 LOCAL val%
2568 val%=1
2570 CASE icon% OF
2580 WHEN 28: IF xmantissa%>1 OR inc%>
6 THEN xmantissa%+=inc%: val%=xmantissa
%: PROCALtersize(13)
2590 WHEN 29: IF xdivisor%>1 OR inc%>0
THEN xdivisor%+=inc%: val%=xdivisor%:
PROCALtersize(13)
2600 WHEN 30: IF ymantissa%>1 OR inc%>0
THEN ymantissa%+=inc%: val%=ymantissa
%: PROCAltersize(14)
                                                                                                                                                    1470 cmenu%!116=0:cmenu%!120=20
         480 $(block%+4)="Internal error number
+STR$(ERR)+" '"+REPORT$+"' at line "
                                                                                                                                                    1480 cmenu%!124=&81:cmenu%!128=0
1490 cmenu%!132=&7000121
                                                                                                                                                                                                                                                                                                                                                                                                                                                3510 $pointer%=pathname$+CHR$(0)
3520 SYS "Wimp_SlotSize",-1,-1 TO appsi
  +STR$(ERL)
490 SYS "Wimp_ReportError",block%,1,"S
                                                                                                                                                    1500 DIM cmenu%1136 30
                                                                                                                                                   1510 $(cmenu%!136)="Keep palette if pos
       rEd*
500 PROCfinish
510 ENDCASE
520 ENDPROC
530 :
540 DEP PROCtellemoff(er$)
550 !useful%-40
550 $(useful%-44)=er$+CHR$(0)
570 SYS "Wimp_ReportError",useful%,1,"
                                                                                                                                                                                                                                                                                                                                                                                                                                                3530 heap%=HIMEM
3540 SYS "Wimp_SlotSize",appsize%+ext%,
                                                                                                                                                   "520 cmenu%!140=0:cmenu%!144=30
1530 ENDPROC
1540:
1550 DEF PROCpol1
1550 block%=0
                                                                                                                                                                                                                                                                                                                                                                                                                                                1
3550 SYS "OS_Heap",0,heap%,,ext%
3560 spritesin%=heap%+16
3570 !spritesin%=ext%
                                                                                                                                                                                                                                                                                                                                                                                                                                                3590 spritesin%14=0
3590 spritesin%18=16
3690 spritesin%112=16
3610 SYS "OS_SpriteOp",256+9,spritesin%
3620 SYS "OS_SpriteOp",256+10,spritesin%
                                                                                                                                                                                                                                                                                                %: FROCaltersize(14)
2610 WHEN 31: IF ydivisor%>1 OR inc%>0
THEN ydivisor%+=inc%: val%=ydivisor%:
                                                                                                                                                    1570 mask%=1
1580 SYS "Wimp_Poll", mask%, block% TO re
   SprEd'
                                                                                                                                                 ason%
         58Ø ENDPROC
                                                                                                                                                   1590 CASE reason% OF
1600 WHEN 2 : SYS "Wimp_OpenWindow",,bl
                                                                                                                                                                                                                                                                                                  PROCaltersize(14)
                                                                                                                                                                                                                                                                                                 2620 ENDCASE
        590:

600 DEF PROCINIT

610 DIM icon% 10

620 %icon%="TASK"+CHR%(0)

630 SYS "Wimp_Initialise",200,licon%,"

orEd" TO,task%
                                                                                                                                                                                                                                                                                                                                                                                                                                               263Ø PROCupdateicon(icon%, STR$(val%))
                                                                                                                                                   1610 WHEN 3 : SYS "Wimp_CloseWindow",,b
                                                                                                                                                                                                                                                                                                 2640 ENDPROC
                                                                                                                                               lock*
1620 WHEN 6: PROCmouse
1630 WHEN 7: PROCdrag
1640 WHEN 9: PROCmenuelect
1650 WHEN 17,18: PROCmensage
1660 WHEN 19: IF waitingfortransfer* T
HEN PROCGetsorapfile
1670 ENDCASE
1680 ENDPROC
1690:
                                                                                                                                                                                                                                                                                                 2660 DEF PROCaltersize(icon%)
                                                                                                                                                                                                                                                                                             2660 DEF PROCAL termine (icon%)
2670 LOCAL val%
2680 CASE icon% OF
2690 WHEN 13 : val%=width%*xmantissa%/x
divisor% : xout%=val%
2700 WHEN 14 : val%=height%*ymantissa%/
ydivisor% : yout%=val%
2710 ENDCASE
2720 PROCASE
2720 PROCASE
       prEd* T0,task%
640 $icon%="iSprEd*+CHR$(0)
650 iq%=1
650 q%=1
650 q%14=0 :q%18=0
670 q%12=70 :q%16=6
690 q%120=2102:q%124=icon%
690 q%128=1 :q%132=8
700 SYS "Wimp_CreateIcon",,q%
710 RNDPROC
720 :
   SprEd"
                                                                                                                                                                                                                                                                                                                                                                                                                                                3710 PROCopen
3720 block%!12=yourref%
                                                                                                                                                                                                                                                                                                2720 PROCupdateicon(icon%, STR$(val%))
2730 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                                                                                                373Ø block%!16=4
                                                                                                                                                    1700 DEF PROCTOUSE
                                                                                                                                                                                                                                                                                                                                                                                                                                                3740 SYS "Wimp_SendMessage", 17, block%, b
                                                                                                                                                    1710 CASE block%!12 OF
1720 WHEN -2:
1730 CASE block%!8 OF
                                                                                                                                                                                                                                                                                                                                                                                                                                             lock%120
         720 :
730 DEF PROCWINDOWS
740 DIM mainw% £1528, infow% £360
750 DIM indirmain% £260, indirinfo% £4
                                                                                                                                                                                                                                                                                            2750 DEF PROCMESSAGE
2760 YOURTET&BLOCK$18
2770 CASE block$16 OF
2780 WHEN 0 : end%=TRUE
2790 WHEN 1 : IF NOT waitingfortransfer
% THEN PROCFECH ELSE PROCGETSORATE
2800 WHEN 2 : PROCGETSORATE
2810 WHEN 3 : PROCGETSORATE
2810 WHEN 3 : PROCGETSORATE
2810 WHEN 3 : PROCGETSORATE
2820 WHEN 4 :
2830 WHEN 4 :
2830 WHEN 5 :
2840 WHEN 6 : IF sent% THEN PROCTRANSMIT
tblank ELSE PROCMAKESPrite:PROCTRANSMIT

                                                                                                                                                                                                                                                                                                  2750 DEF PROCESSAGE
                                                                                                                                                                                                                                                                                                                                                                                                                                                375Ø ENDPROC
                                                                                                                                                1748 CASE block%18 OF
1740 WHEN 4,1: IF spriteloaded% THEN P
ROCopen EISE PROCtellemoff("To edit a sp
rite drag its icon to SprRd")
1750 WHEN 2: PROCmenu(menu%,170)
1760 ENDCASE
                                                                                                                                                                                                                                                                                                                                                                                                                                                3760
                                                                                                                                                                                                                                                                                                                                                                                                                                                 3770 DEF PROClooseheap
                                                                                                                                                                                                                                                                                                                                                                                                                                                3770 DEF PROCIOGENEAD
3790 heapt=0
3790 mpriteloaded%=FALSE
3800 SYS "Wimp SlotSize",appsize%,-1
3810 ENDROC
3820 :
        760 SYS "Wimp OpenTemplate",, "<SprEd$D
750 SYS "Wimp_Upenrum,"
ir> Templates"
770 SYS "Wimp_LoadTemplate", mainw%, in
dirmain%, indirmain%+1000, -1, "edit", 0
780 SYS "Wimp_LoadTemplate", infow%, in
dirinfo%, indirinfo%+8100, -1, "info", 0
790 SYS "Wimp_CreateWindow", mainw% TO
-41+%
                                                                                                                                                   1760 EMDCASE
1770 WHEN edit%
1780 CASE block%18 OF
1790 WHEN 2: PROCmenu(cmenu%,0)
1800 WHEN 4:
1810 CASE block%116 OF
1820 WHEN 17: PROCaterratic(28,1)
1830 WHEN 20: PROCaterratic(28,1)
1840 WHEN 21: PROCaterratic(28,-1)
                                                                                                                                                                                                                                                                                                                                                                                                                                                3830 DEF PROCinfosprite(sprite%)
                                                                                                                                                                                                                                                                                                                                                                                                                                                3840 !q%=0
3850 SYS "OS_SpriteOp",13+256,spritesin
                                                                                                                                                                                                                                                                                                                                                                                                                                           3846 IC%=0
3856 SYS "OS_SpriteOp",13+256, spritesin
%,4%,12, sprite%
3866 SYS "OS_SpriteOp",40+256, spritesin
%,4% TO,,, width%, height%, sprmask%, mode%
3876 SYS "OS_SpriteOp",24+256, spritesin
%,4% TO,, spradd%
3880 IF spradd%4132<>44 THEN sprpalin%=8
pradd%+44 HESE sprpalin%=0
3890 IF spradd%132<>44 THEN sprpalin%=8
pradd%+44 HESE sprpalin%=0
3890 IF sprpalin% THEN cmenu%1124=681:
cmenu%1132=27400121:kpal%=1 HLSE cmenu%
1124=280:cmenu%1132=27400121:kpal%=0
3900 spriteinS=NN:idy(4%)
3910 spriteinS=NN:idy(4%)
3910 spriteinS=NN:idy(4%)
3920 xout%=width%
3930 yout%=height%
3940 REM PROCupdateicon(19, fileins)
3950 REM PROCupdateicon(19, fileins)
3950 REM PROCupdateicon(16, STRK(width%))
3980 PROCupdateicon(19, spriteins)
4000 PROCupdateicon(12, STRK(mode%))
4010 PROCupdateicon(12, STRK(mode%))
4010 PROCupdateicon(12, STRK(mode%))
4020 PROCupdateicon(12, STRK(mode%))
4030 PROCupdateicon(12, STRK(mode%))
4030 PROCupdateicon(13, STRK(width%))
4030 PROCupdateicon(14, STRK(width%))
4030 PROCupdateicon(14, STRK(width%))
     800 SYS "Wimp_CreateWindow",,infow% TO info%
        nrow
810 SYS "Wimp_CloseTemplate"
820 loadnameaddr%=FNfindaddress(19)
830 savenameaddr%=FNfindaddress(16)
840 ENDPROC
                                                                                                                                                                                                                                                                                              prite
2850 WHEN 7 : PROCGrab
                                                                                                                                                   1850 WHEN 23 : PROCalterratio(29,1)
1870 WHEN 24 : PROCalterratio(39,-1)
1870 WHEN 24 : PROCalterratio(30,1)
1880 WHEN 25 : PROCalterratio(30,1)
1890 WHEN 26 : PROCalterratio(31,1)
1890 WHEN 27 : PROCalterratio(31,1)
1910 WHEN 36 : PROChextsprite(1)
1920 WHEN 37 : PROChextsprite(1)
1930 WHEN 44 : PROCquicksave
1940 RNDCASE
                                                                                                                                                                                                                                                                                                 2860 ENDCASE
                                                                                                                                                                                                                                                                                                 287Ø ENDPROC
                                                                                                                                                                                                                                                                                                 2880
                                                                                                                                                                                                                                                                                             2880:
2890 DEF PROCFETCH
2900 IF heap% THEN PROCIOOSENEAP
2910 IF block%140c&ff9 THEN PROCTEILEM
off("Not a Sprite File"): ENDPROC
2920 SYS "Wimp_SlotSize",-1,-1 TO appsi
ze%
2930 heap%=HIMEM
2940 ext%=block%136+4
2950 SYS "Wimp_SlotSize",appsize%+ext%,-1
         860 DEFFNfindaddress(icon%)
        870 !q%=edit%
880 q%!4=icon%
890 SYS "Wimp_GetIconState",,q%
         900 =q%128
910 :
1946 RNDCASE
1950 WHEN 1:
1960 CASE block%:16 OF
1970 WHEN 20: FROCalterratio(28,-1)
1990 WHEN 21: PROCalterratio(28,1)
1990 WHEN 21: PROCalterratio(29,-1)
2000 WHEN 23: PROCalterratio(39,-1)
2010 WHEN 24: PROCalterratio(30,1)
2020 WHEN 25: PROCalterratio(30,1)
2030 WHEN 26: PROCalterratio(31,-1)
2040 WHEN 27: PROCalterratio(31,-1)
2050 WHEN 36: PROCactorprite(-1)
2060 WHEN 36: PROCactorprite(-1)
2060 WHEN 36: PROCactorprite(-1)
                                                                                                                                                                                                                                                                                                 1
2960 SYS "OS_Heap",0,heap%,,ext%
                                                                                                                                                                                                                                                                                                2970 spritesin%=heap%+16
2980 !spritesin%=ext%
2990 block%!12=yourref%
3000 block%!16=6
                                                                                                                                                                                                                                                                                                                                                                                                                                               4000 PROCupdateion(12,5TRs(mode%))
4010 PROCupdateion(13,5TRs(widths))
4010 PROCupdateion(14,5TRs(height%))
4010 PROCupdateion(40,spriteout$)
4010 PROCessetratios
4050 ENDFROC
                                                                                                                                                                                                                                                                                                 3010 block%!20=spritesin%+4
                                                                                                                                                                                                                                                                                                 3020 block%!24=block%!36
                                                                                                                                                                                                                                                                                                 3030 SYS "Wimp_SendMessage", 18, block%, b
                                                                                                                                                   2070 ENDCASE
                                                                                                                                                                                                                                                                                                                                                                                                                                              4050 :
4070 DBF PROCresetratios
4080 LOCAL icon%
4090 FOR icon%28 TO 31
4100 PROCupdateicon(icon%,*1*)
4110 NEXT
4120 xmantissa%=1
4130 xdivisor%=1
4140 ymantissa%=1
4150 ydivisor%=1
                                                                                                                                                                                                                                                                                                3040 waitingfortransfer%=TRUE
3050 ENDPROC
                                                                                                                                                   2080 ENDCASE
                                                                                                                                                   2090 ENDCASE
                                                                                                                                                   2100 ENDPROC
                                                                                                                                                                                                                                                                                                3060 :
3070 DEF PROCGRAD
3080 IF NOT waitingfortransfer% THEN EN
                                                                                                                                                   2110
     1040 DATA &FFFFFFF10,&10
                                                                                                                                              2120 DEF PROCmenu(menu%,y%)
2130 SYS "Wimp_CreateMenu",,menu%,!bloc
k%-60,block%!44y%
2140 menuselect%=menu%
                                                                                                                                                                                                                                                                                                JPROC
3090 sprquan%=spritesin%!4
3100 spriteno%=1
3110 spriteloaded%=TRUE
     1070 DEF PROCCreatement
                                                                                                                                                   2140 menusel
2150 ENDPROC
     1080 $menu%="SprEd"
```



```
5680 ENDIF
5690 ENDIF
5700:
5710 REM the business
5710 FOR Y4=0 TO YOUT%-1
5730 FOR X*=0 TO YOUT%-1
5740 SYS 'OS_SpritcOp',256+41,spritcsin
%,spritcing,X%*xdivisor%/ymantissa%,Y*ty
divisor%/ymantissa% TO ,,,,,colour%,tint
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              6400 q%132=thirtytwo%
6410 q%128=twentyeight%
6420 q%124=twentyfour%
6430 q%130=twenty%
6440 q%116=3
6450 q%112=yourref%
6460 q%136=sizo%
6470 q%140=sff9
6480 $(q%+44)=FNleaf($savename%)+CHR$(0
     4160 ENDPROC
                                                                                                                                                                                                                                         4940 REM PROCtellemoff(STR$"(sizefactor
     4160 ENDERNO.
4170:
4180 DEFFNTidy(in%)
4190 LOCAL is, temp$, out$
4200 REPEAT
4210 temp$=CRT$(in%7i%)
4220 IF ASC(temp$)>31 THEN out$=out$+te
                                                                                                                                                                                                                                           4950 =xout%*yout%*sizefactor%+256
                                                                                                                                                                                                                                        4960 :
4970 DEF PROCgetsavename
4980 pathname$=PNridy(block*+44)
4990 IF INSTR(pathname$, scrap$)<1 THEN
5000 fileout$=pathname$
5010 PROCupdateicon(16, fileout$)
5020 ELSE
5030 fileout$=parmytes$
  mp$
4230 i%+=1
4240 UNTIL ASC(temp$)=0
4250 =out$
4260 :
                                                                                                                                                                                                                                         5030 fileout$=newsprite$
5040 PROCupdateicon(16,fileout$)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                   5750 IF skip% THEN tint%=tintpal%?colour% : colour%=palette%!colour%
5760 SYS "OS_SpirteOp", 256442,tempsprit
e%,spriteout%,xk,y%,colour%,tint%
5770 IF mask% THEN
5780 SYS "OS_SpirteOp",25643,spritesin
%,spritein%,x%xxivisor%/mantisas%,y%*y
divisor%/ymantisas% TO .,,,maskcolour%
5790 SYS "OS_SpriteOp",256444,tempsprit
e%,spriteout%,x%,y%,maskcolour%
5800 ENDIF
5810 perc%=(xout%*y%*100)/(xout%*yout%)
5820 SYS "Hourglass_Percentage",perc%
5830 HNET
5840 NEXT
5840 NEXT
5850 SYS "Hourglass_Off"
5860 SYS "OS_Byte",229,1,0
5870 SYS "OS_Byte",229,1,0
5870 SYS "OS_Byte",124
5880 KNUPROC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             5750 IF skip% THEN tint%=tintpal%?colou
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 6490 !q%=60
6500 SYS "Wimp_SendMessage",18,q%,q%!20
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        6500 SYS "Wimp_SendMessage",18,q%,q%120
,q%124
6510 EMDIF
6520 quicksave%=0
6530 SYS "Wimp_SlotSize",appsizeout%,-1
6540 EMDPROC
6550 ISF PROCtransmitsprite
6570 SYS "Wimp_TransferBlock",task%,tem
psprite%+4,block%14,block%120,size%
6580 block%1657
6590 block%1657
6590 block%124-size%
6610 SYS "Wimp_SendMessage",18,block%,b
  4260 :

4270 DEFFNaddx(s$,length*)

4280 IF LEN(FNleaf(s$))>=length* THEN R

IGHT$(s$,1)="X" ELSE s$+="X"

4290 =s$
                                                                                                                                                                                                                                         5050 ENDIE
                                                                                                                                                                                                                                         5060 ENDPROC
                                                                                                                                                                                                                                           5080 DEF PROCmakesprite
                                                                                                                                                                                                                                   5080 DEF PROCHARESPITE
5090 Spriteout5=FNfindtext(40)+CHR$(0)
5100 size%=FNsize
5110 SYS "05_ReadModeVariable",mode%,3
TO ,,coloursin%
5120 SYS "Wimp_SlotSize",-1,-1 TO appsi
     4390 :
4310 DEP PROCupdateicon(icon%, string$)
4320 lq%=edit%
4330 q%1=icon%
4340 SYS "Mimp_GetIconState",,q%
4350 q%18=0
4360 g%112=0
4370 $Q%128=string$+CHR$(0)
4380 SYS "Mimp_SetIconState",,q%
4390 EMDPROC
                                                                                                                                                                                                                                    zeout%
5130 heapout%=heap%+ext%+32
5140 SYS "Wimp_SlotSize",appsizeout%+si
                                                                                                                                                                                                                                5140 SYS "nimpoittos... ppp.
ze%, -1
5150 SYS "OS_Reap",0, heapout%,, size%
5160 tempsprite%=heapout%
5170 itempsprite%14=0
5190 tempsprite%14=0
5190 tempsprite%16=16
5200 REM tempsprite%112=16
5210 SYS "OS_SpriteOp",256+9,tempsprite
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 6620 sent%=TRUE
6630 ENDPROC
     4400 : 4410 DEFFNleaf(s$)
4420 WHILE INSTR(s$, ":")>0
4430 WSSELE INSTR(s$, ":")+1)
4430 WSSELE INSTR(s$, ":")+1)
4440 ENDMHLE
4450 WHILE INSTR(s$, ".")>0
4460 S$&MILE INSTR(s$, ".")+1)
4470 ENDWHILE
4480 =$
4500 DEF PROCNEXEPTITE(inc$)
4500 DEF PROCNEXEPTITE(inc$)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              588Ø ENDPROC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          6640:
6650 DEP PROCtransmitblank
6660 SYS "Mimp_TransferBlock", task%, tem
psprite%*size%, block%14, block%120,0
6570 block%115=7
6680 block%12=yourref%
6690 block%124=0
f708 SYS "Mimp_SendMessage", 17, block%, b
lock%14
6710 sent%=PALSE
6720 SYS "Mimp_SlotSize", appsizeout%, -1
6730 ENDPROC
6740:
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 6640
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             5900 DEFFNpalette(colours%, code%)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                           5900 DEFENDALETE (colours*, code*)
5910 LOCAL palette*
5920 IF sprpalin*s0 AND code* THEN
5930 palette*=FMsprpalette
5940 ELSE
5950 CASE colours* OF
5960 WHEN 63 : palette*=1
5970 WHEN 15 : palette*=table*
5980 WHEN 3 : palette*=table*
5980 WHEN 3 : palette*=table*+128
5990 WHEN 1 : palette*=table*+144
6000 ENDCASE
                                                                                                                                                                                                                                        5220 pcode%=ABS(kpal%=1 AND coloursin%=
                                                                                                                                                                                                                                    5230 SYS "OS_SpriteOp", 256+15, tempsprit
e%, spriteout$, pcode%, xout%, yout%, modeout
4500 DEF PROCenterprite(inc%)
4510 spriteno%+inc% 4510 spriteno%+inc% 4510 spriteno%+inc% 1 ENDPROC
4530 PROCupdateicon(35,STR$(spriteno%))
4540 PROCundosprite(spriteno%)
4550 ENDPROC
                                                                                                                                                                                                                                         5240 IF sprmask% THEN SYS "OS_SpriteOp"
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             6728 SYS *Wimp_SlotSize*,appsizeout%,
6738 ENDPROC
6740:
6750 DEFFNconvert(colour%)
6756 LECAL red%,green%,blue%
6756 LECAL red%,green%,blue%
6780 red%=(c% AND 4F8)/&40
6780 green%=(c% AND 4F8)/&40
6780 green%=(c% AND 4F80000)/&400000
6810 tint%=(c% AND 4F00000)/&4000000
6810 tint%=(c% AND 4F00000)/&4000000
6810 tint%=(c% AND 4F00000)/&4000000
6810 blue%=blue%<4
6840 colour% red%+green%+blue%
6850 colour%
6860 LOCAL red%,green%,blue%
6870 DEFFNinvert(colour%)
6880 LOCAL red%,green%,blue%
6890 red%=colour% AND %110000)>>4
6910 green%=(colour% AND %110000)>>4
6920 red%=colour% AND %110000)>>4
6930 green%=green%*&40000
6930 green%=pren%*&400000
6950 colour%=colour%
                                                                                                                                                                                                                                     ,256+29,tempsprite%,spriteout$
5250 PROCconvertsprite
5260 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              6010 ENDIF
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             6020 =palette%
    4560 : 4570 DEF PROCstartdrag
4570 DEF PROCstartdrag
4580 lq%=edit%
4590 SYS "Mimp_DetWindowState",,q%
4690 z%=q%16-q%18
4610 x%=q%14:y%=q%18:q%14=17
4620 SYS "Mimp_DetFconState",,q%
4630 q%18-m%;q%120-my%+z%
4640 q%16-m%;q%120-my%+z%
4650 q%120-my%120-my%+z%
4650 q%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%120-my%1
                                                                                                                                                                                                                                         5280 DEF PROCconvertsprite
        4560
                                                                                                                                                                                                                                       5280 DEF PROCOurertsprite
5290 LOCAL skip%
5300 SYS "OS_Byte",229,8,0
5310 skip%=1
5320 SYS "hourglass_On"
5330 :
5340 RBM find palettes
5350 CASE desktopcol% OF
5360 MBM ST
5370 IF kpal% AND coloursin%=coloursout
& TERN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             6040 DEFFNsprpalette
6050 IF coloursin%=63 THEN
6060 =1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                           6666 =1
6070 ELSE
6080 FOR 1%=0 TO coloursin%
6090 temppal%:(1%*4)=sprpalin%:(1%*8)
6100 tintpal%71%=0
6110 NEXT
6120 temppal%
6130 ENDIF
6140 :
6150 NERPENEEEPPREEEPPREEEPPREEEPPREEEPPREEEPPREEEPPREEEPPREEEPPREEEPPREEE
                                                                                                                                                                                                                                    % THEN
5380 skip%=0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                         6140:
6150 DEFFNkeeppalette
6160 SYS "OS_SpriteOp",24+256,tempsprit
e%,spriteout$ TO,,spraddout%
6170 FOR i%=32 TO (spradd%132)-1
                                                                                                                                                                                                                                         5390 palin%=FNpalette(coloursin%,1)
                                                                                                                                                                                                                                           5400 palout%=FNkeeppalette
5410 ELSE
     4690 RNDPROC
4710 DEF PROCOdrag
4710 DEF PROCOdrag
4720 fileout$=PRleaf(FNfindtext(16))
4730 size*=FNsize
4740 [q%=0
4750 SYS "Mimp_GetPointerInfo", q%
4760 Fg q%112=edit% TREN ENDPROC
4770 q%123=q%4 : thirtytwo%=q%122
4780 q%128=1q% :twentyeight%=q%128
4790 q%124=q%16 :twentyfour%=q%124
4890 q%120=q%12 :twentyfour%=q%124
4800 q%104=12=0
4810 q%166=1
4820 q%140=£ff9
4830 q%160=£ff9
4840 q%140=£ff9
4850 S(q%440=£ff9)
4860 [q%=60
4870 SYS "Mimp_SendMessage",18,q%,q%120
q%120
                                                                                                                                                                                                                                         5410 BLSE
5420 palin%=FNpalette(coloursin%,1)
5430 palout%=FNpalette(coloursout%,0)
5440 ENDIF
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             6180 spraddout%?i%=spradd%?i%
6190 NEXT
                                                                                                                                                                                                                                        5440 EMDIF

5450 WHEN 2

5460 palout%=0

5470 palout%=0

5480 WHEN 1

5490 palout%=FMpalette(coloursout%,0)

5500 wHEN 0

5500 palout%=FMpalette(coloursin%,1)

5500 palout%=0
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             6200 =spraddout%+44
6210 :
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 6950 colour%=red%+green%+blue%
6960 colour%=colour%<<8
                                                                                                                                                                                                                                                                                                                                                                                                                                                                         6210 EF PROCPALETTE
6220 DEF PROCPALETTE
6230 FOR 1%=0 TO 63
6240 SYS "ColoutTrans ReturnColourNumbe
FORMOde", FNinvert(1%), modeout%, palout%
TO col%
6250 palette%F1%=col%
6260 NEXT
6270 ENDPROC
6280 :
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  6970 =colour%
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  6980
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         0990 DEFFRfindtext(icon%)
7808 !q%=edlt%
7810 q%!4=icon%
7812 8YS "Mimp_GetIconState",,q%
7838 =$q%128
7848:
7850 DEF PROCquicksave
7858 savename$=PNfindtext(16)
7878 IF INSTR(savename$,"-")-1 OR INSTR
(savename$,"-")-1 THEN
7888 PROCtellemoff("Drag the icon to a
directory viewer or sprite file window")
7898 ELSE
7100 pathname$=savename$
7110 quicksave%=1
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  6990 DEFFNfindtext(icon%)
                                                                                                                                                                                                                                           5530 palout%=0
5540 ENDCASE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                             6280 :
6290 DEF PROCPALETE1
6390 FOR i%=0 TO coloursin%
6310 palette%?i%=FNconvert(palin%!(i%*4
                                                                                                                                                                                                                                         5550 :

5560 REM make tables

5570 IF palin%=1 THEN

5580 IF palout%=1 THEN

5590 skip%=0

5600 ELSE
 4870 SYS "Wimp_SendMessage",18,q%,q%120,q%124
4880 ENDPROC
4890:
4910 modeout%*VAL(FNfindtext(12))
4920 SYS "05 ReadModeVariable",modeout%
,3 TO ,coloursout%
4930 sizefactor%=(-1*(coloursout%=1))-(
1*(coloursout%=3))-(3*(coloursout%=15))-
(3*(coloursout%=3))+(1*sprmask%)
                                                                                                                                                                                                                                                                                                                                                                                                                                                                         ))
6320 tintpal%?i%=tint%
                                                                                                                                                                                                                                   5600 ELSE
5610 PROCpalette2
5620 ENDIF
5630 ELSE
5640 IF palout%=1 THEN
5650 PROCpalette1
5660 ELSE
5670 SYS "ColourTrans_SelectTable",mode
%,palin%,modeout%,palout%,palette%
                                                                                                                                                                                                                                                                                                                                                                                                                                                                              6340 ENDPROC
                                                                                                                                                                                                                                                                                                                                                                                                                                                                         6340 ENDPROC
6350 :
6360 DEP PROCsavesprite
6370 $savename%-pathname$+CHR$(0)
6380 SYS "0S_SpriteOp",256+12,tempsprit
e%,savename%-
6390 IF quicksave%-0 THEN
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    7110 quicksave%=1
7120 PROCmakesprite
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    7130 PROCsavesprite
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    7140 ENDIF
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  715Ø ENDPROC
```

#### Life

|                                   | 270 STA vlo            | 560 ADC #64            | 850 BIT senile                |
|-----------------------------------|------------------------|------------------------|-------------------------------|
| Listing 1                         | 280 TAY                | 570 STA clo            | 860 BMI nowt                  |
|                                   | 290 .loop              | 580 BCC done1          | 870 CLC                       |
| 10 REM >LifeAss (Life1)           | 300 STA (vlo),Y        | 590 INC chi            | 880 ADC #1                    |
| 20 REM By J.G.Harston             | 310 INY                | 600 .done1             | 890 STA (clo), Y              |
| 30 REM Based on Phil Bender's     | 320 BNE loop           | 610 DEX                | 900 BEQ kill_off              |
| 40 REM in BAU May 1990            | 330 INC vhi            | 620 BPL loop2          | 910 CMP #&F8                  |
| 50 REM B/B+/M/C                   | 340 DEX                | 630 :                  | 920 BNE nowt                  |
| 60 REM (C) BAU                    | 350 BNE 100p           | 640 .update            | 930 JSR print                 |
| 70 :                              | 360 RTS                | 650 LDA #votes DIV 256 | 940 JMP nowt                  |
| 80 MODE7                          | 370 :                  | 660 STA vhi            | 950 .chk3                     |
| 90 clo=&70:chi=&71                | 380 .life              | 670 LDA #cells DIV 256 | 960 CMP #3                    |
| 100 vlo=&72:vhi=&73               | 390 SEI                | 680 STA chi            | 970 BNE dead                  |
| 110 tempa=&74:tempx=&75:tempy=&76 | 400 LDA #cells DIV 256 | 690 LDA #0             | 980 LDA #0                    |
| 120 loy=&77:hiy=&78               | 410 STA chi            | 700 STA vlo            | 990 STA (vlo),Y               |
| 130 scrlo=&79:scrhi=&7A           | 420 LDA #0             | 710 STA clo            | 1000 LDA (clo),Y              |
| 140 gen=&7B:delay=&7F:char=&80    | 430 STA clo            | 720 LDX #0             | 1010 BNE check_age            |
| 150 birth=&AFF:REM age at birth   | 440 LDX #31            | 730 .loop4             | 1020 LDA birth:\ New one born |
| 160 senile=&AFE                   | 450 .loop2             | 740 LDY #63            | 1030 JSR print                |
| 170 col=&C00:row=&C80             | 460 LDY #63            | 750 .loop5             | 1040 JMP nowt                 |
| 180 cells=&2000:votes=&2800       | 470 .loop3             | 760 LDA (vlo)., Y      | 1050 .dead                    |
| 190 osbyte=&FFF4:oswrch=&FFEE     | 480 LDA (clo),Y        | 770 BEQ nowt           | 1060 LDA #0                   |
| 200 FOR opt=0 TO 3 STEP3          | 490 BEQ next           | 780 CMP #4             | 1070 STA (vlo),Y              |
| 210 P%=4900                       | 500 JMP vote           | 790 BNE chk3           | 1080 LDA (clo),Y              |
| 220 [OPT opt                      | 510 .next              | 800 LDA #0             | 1090 BEQ nowt                 |
| 230 .zero                         | 520 DEY                | 810 STA (vlo),Y        | 1100 .kill_off                |
| 240 STA vhi                       | 530 BPL 100p3          | 820 .check_age         | 1110 LDA #0                   |
| 250 LDX #8                        | 540 LDA clo            | 830 LDA (clo),Y        | 1120 JSR print:\ dead cell    |
| 260 LDA #0                        | 550 CLC                | 840 BEQ nowt           | 1130 .nowt                    |

| 1140 DEY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1960 LDX #&EF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1150 BPL loop5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 1970 JSR rd_key                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 1160 INX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 1980 BCS ret                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 1170 LDA vlo                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 1990 JMP life                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 1180 CLC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2000 .ret                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| 1190 ADC #64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2010 CLI                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 1190 ADC #64<br>1200 STA vlo                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2020 RTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 1210 STA clo                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2030 .rd_key                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 1220 BCC loop4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2040 LDA #681                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 1230 INC vhi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2050 LDY #&FF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 1240 TNC chi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2060 JMP osbyte                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 1250 CDV #32                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2070 :                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 1240 INC chi<br>1250 CPX #32<br>1260 BNE loop4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2080 .add_voteC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 1270 \ all done                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2090 CLC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 1280 LDX #0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2100 .add_vote                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| 1298 100n6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2110 LDA (vlo),Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 1290 .loop6<br>1300 INC gen,X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2120 ADC #1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 1310 LDA gen,X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2130 STA (vlo),Y                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 1320 CMP #58                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2140 RTS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 1330 BNE nocarry                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | 2150 .vote                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 1340 LDA #48                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2160 STY tempy \ 123                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 1340 LDA #48<br>1350 STA gen,X                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2170 LDA clo \ 4*6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 1360 INX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2180 STA vlo \ 789                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 1370 CPX #4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2190 LDA chi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 1380 BNE loop6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2200 CLC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 1390 .nocarry                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2210 ADC #8                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 1400 LDA #31                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2220 STA vhi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 1410 JSR oswrch                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2230 JSR add_vote \ 5                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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| 1420 LDA #73                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2240 DEY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 1430 JSR oswrch<br>1440 LDA #25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 2250 TYA<br>2260 AND #63                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 1440 LDA #25                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2270 TAY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 1450 JSR oswrch:\ TAB(73,25);                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 1460 LDX #3                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 228Ø STY loy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 1470 .loop7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2290 JSR add_vote \ 4                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 1480 LDA gen,X<br>1490 JSR oswrch                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2300 INY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 1490 JSR oswrch<br>1500 DEX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2310 INY<br>2320 TYA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
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| 1510 BPL loop7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 233Ø AND #63                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 1520 LDA delay                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 2340 TAY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 1530 BEQ key1<br>1540 .loopA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2350 STY hiy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 1540 .loopA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2360 JSR add_vote \ 6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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| 1550 TAX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2370 LDA vlo                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 1560 .loopB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2370 LDA vlo<br>2380 SEC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 1560 .loopB<br>1570 LDY #0                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2370 LDA vlo<br>2380 SEC<br>2390 SBC #64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 1560 .loopB<br>1570 LDY #0<br>1580 .loopC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2370 LDA vlo<br>2380 SEC<br>2390 SBC #64                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 1560 .loopB<br>1570 LDY #0<br>1580 .loopC<br>1590 INY                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 2370 LDA vlo<br>2380 SEC<br>2390 SEC #64<br>2400 STA vlo<br>2410 BCS here1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 1560 : loopE<br>1570 LDY #0<br>1580 :loopC<br>1590 INY<br>1600 BNE loopC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2370 LDA vlo<br>2380 SEC<br>2390 SEC #64<br>2400 STA vlo<br>2410 BCS herel<br>2420 DEC vhi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 1500 loopB<br>1570 LDY #0<br>1580 loopC<br>1590 INY<br>1600 BNE loopC<br>1610 DEX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2370 LDA vlo<br>2380 SEC<br>2390 SBC #64<br>2400 STA vlo<br>2410 BCS herel<br>2420 DEC vhi<br>2430 LDA vhi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 1560 : loopB<br>1570 LDY #0<br>1588 :loopC<br>1590 INY<br>1600 ENE loopC<br>1610 DEX<br>1620 ENE loopB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2370 LDA vlo<br>2380 SEC<br>2390 SEC #64<br>2400 STA vlo<br>2410 BCS herel<br>2420 DEC vhi<br>2430 LDA vhi<br>2440 CMP #827                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 1560 : loopB<br>1570 LDY #0<br>1588 :loopC<br>1590 INY<br>1600 ENE loopC<br>1610 DEX<br>1620 ENE loopB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2376 LDA vlo 2386 SEC 2396 SEC #64 2406 STA vlo 2416 BCS herel 2426 DEC vhi 2436 LDA vhi 2446 CMP #827 2456 BME herel                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 1560 .loopB<br>1570 LDY #8<br>1580 .loopC<br>1590 INY<br>1600 BNE loopC<br>1610 DEX<br>1620 BNE loopB<br>1630 DEC delay<br>1640 BNE loopA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2370 LDA vlo 2380 SEC 2390 SEC #64 2400 STA vlo 2410 BCS herel 2420 DEC vhi 2430 LDA vhi 2440 CMP #27 2450 BNE herel 2460 LDA #227                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 1500 loopB<br>1570 LDY #0<br>1580 loopC<br>1590 INY<br>1600 BNE loopC<br>1610 DEX                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2370 LDA vlo<br>2380 SEC<br>2390 SEC #64<br>2400 STA vlo<br>2410 BCS herel<br>2420 DEC vhi<br>2430 LDA vhi<br>2440 CMP #827                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 1500 loopB<br>1570 LDY #0<br>1580 loopC<br>1590 INY<br>1600 BNE loopC<br>1610 DEX<br>1620 BNE loopB<br>1630 DEC delay<br>1640 BNE loopA<br>1650 STA delay<br>1660 key1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2376 LDA vlo 2386 SEC 2390 SEC #64 2400 STA vlo 2410 ECS here1 2420 DEC vhi 2430 LDA vhi 2440 CMP #627 2456 BNE here1 2466 LDA #82F 2470 STA vhi 2486 .LDA #82F                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 1560 : loopB<br>1570 LDY #0<br>1580 :loopC<br>1590 INY<br>1600 BNE loopC<br>1610 DEX<br>1620 BNE loopB<br>1630 DEC delay<br>1640 BNE loopA<br>1650 STA delay<br>1660 :key1<br>1670 LDX #ACF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 2370 LDA vlo 2380 SEC 2390 SEC #64 2400 STA vlo 2410 ECS here1 2420 DEC vhi 2430 LDA vhi 2440 CMP #627 2450 BNE here1 2460 LDA #82F 2470 STA vhi 2480 .here1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 1560   loopB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2370 LDA vlo 2380 SEC 2390 SEC #64 2400 STA vlo 2410 ECS here1 2420 DEC vhi 2430 LDA vhi 2440 CMP #627 2450 BNE here1 2460 LDA #82F 2470 STA vhi 2480 .here1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| 1500 loopB<br>1570 LDY #0<br>1580 loopC<br>1590 INY<br>1600 BNE loopC<br>1610 DEX<br>1620 BNE loopB<br>1630 DEC delay<br>1640 BNE loopA<br>1650 STA delay<br>1660 key1                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2370 LDA vlo 2380 SEC 2390 SEC #64 2400 STA vlo 2410 BCS here1 2420 DEC vhi 2430 LDA vhi 2440 CMP #827 2450 BNE here1 2460 LDA #22F 2470 STA vhi 2480 .here1 2490 JSR add_voteC \ 3 2500 LDY tempy 2510 JSR add_vote \ 2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 1560   loopB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2370 LDA vlo 2380 SEC 2390 SEC #64 2400 STA vlo 2410 ECS here1 2420 DEC vhi 2430 LDA vhi 2430 LDA vhi 2440 CMP #227 2450 ENE here1 2460 LDA #22F 2470 STA vhi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| 1560 .loopB 1570 LDV #0 1580 .loopC 1590 INV 1600 BNR loopC 1610 DEX 1620 BNR loopB 1630 DEC delay 1640 BNR loopA 1650 STA delay 1660 .key1 1670 LDX #&CF 1660 JSR rd_key 1680 ECC key2 1700 LDA #24 1710 STA delay                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2370 LDA vlo 2380 SEC 2390 SEC #64 2400 STA vlo 2410 BCS herel 2420 DEC vhi 2430 LDA vhi 2440 CMP #827 2450 NDE herel 2460 LDA #82F 2470 STA vhi 2480 .herel 2490 JSR add_voteC \ 3 2500 LDY tempy 2510 JSR add_vote \ 2 2520 LDY loy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 1550 LOODB 1570 LDY #0 1580 LOODC 1590 INY 1600 BNE looDC 1610 DEX 1620 BNE looDB 1630 DEC delay 1640 BNE looDA 1650 STA delay 1660 Key1 1670 LDX #ACF 1690 BCC key2 1700 LDA #24 1710 STA delay 1720 JNE 1574 delay 1720 JNE 1720 J | 2370 LDA vlo 2380 SEC 2390 SEC #64 2400 SEA vlo 2410 BCS herel 2420 DEC vhi 2430 LDA vhi 2446 CMP #827 2450 NDA #827 2450 NDA #82F 2460 LDA #82F 2470 SEA vhi 2480 .herel 2480 .herel 2490 JSR add_vote \ 3 2500 LDY tempy 2510 JSR add_vote \ 2 2520 LDY loy 2530 JSR add_vote \ 1 2540 LDA vlo                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 1560 .loopB 1570 LDV #8 1580 .loopC 1590 INY 1600 BNE loopC 1610 DEX 1620 BNE loopB 1630 DEC delay 1640 BNE loopA 1650 .STA delay 1660 .LDX #SCP 1680 JSR rd_key 1680 LDX #SCP 1680 LDX #SCP 1700 LDA #24 1710 STA delay 1720 JME life 1730 .key2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | 2370 LDA vlo 2380 SEC 2390 SEC #64 2400 STA vlo 2410 BCS here1 2420 DEC vhi 2430 LDA vhi 2440 CMP #227 2450 ENE here1 2460 LDA #22F 2470 STA vhi 2480 .here1 2490 JSR add_vote \ 3 2500 LDY tempy 2510 JSR add_vote \ 1 2540 LDA vlo 2550 LDY LOY 2550 LDA vlo                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 1560 .loopB 1570 LDV #0 1580 .loopC 1590 INV 1600 BNR loopC 1610 DEX 1620 BNR loopB 1630 DEC delay 1640 BNR loopA 1650 STA delay 1660 .key1 1670 LDX #&CF 1660 JSR rd_key 1680 ECC key2 1700 LDA #24 1710 STA delay                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2370 LDA vlo 2380 SEC 2390 SEC #64 2400 STA vlo 2410 BCS here1 2420 DEC vhi 2430 LDA vhi 2440 CMP #227 2450 ENE here1 2460 LDA #22F 2470 STA vhi 2480 .here1 2490 JSR add_vote \ 3 2500 LDY tempy 2510 JSR add_vote \ 1 2540 LDA vlo 2550 LDY LOY 2550 LDA vlo                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 1500 loopB 1570 LDT #0 1580 loopC 1590 INY 1600 BNE loopC 1610 DEX 1620 BNE loopB 1630 BCC delay 1640 BNE loopA 1650 STA delay 1660 key1 1670 LDX #6CF 1680 JSR rd key 1690 BCC key2 1700 LDA #24 1710 STA delay 1720 JMP life 1731 key2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2370 LDA vlo 2380 SEC 2390 SEC #64 2400 STA vlo 2410 BCS here1 2420 DEC vhi 2430 LDA vhi 2446 CMP #827 2450 NDE here1 2460 LDA #22F 2460 LDA #22F 2470 STA vhi 2480 .here1 2490 JSR add_vote \ 3 2500 LDY tempy 2510 JSR add_vote \ 2 2520 LDY loy 2530 JSR add_vote \ 1 2550 LDC vlo                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 1500 loopB 1570 LDT #8 1580 loopC 1590 INY 1600 BNE loopC 1610 DEX 1620 BNE loopB 1630 BCC delay 1640 BNE loopA 1650 STA delay 1660 key1 1670 LDX #6CF 1680 JSR rd key 1690 BCC key2 1700 LDA #24 1710 STA delay 1720 JMP life 1731 key2 1742 LDX #6CF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2370 LDA vlo 2380 SEC 2390 SEC #64 2400 STA vlo 2410 BCS here1 2420 DEC vhi 2430 LDA vhi 2440 CMP #827 2450 NEW here1 2460 LDA #22F 2470 STA vhi 2480 .here1 2490 JSR add_vote \ 3 2500 LDY tempy 2510 JSR add_vote \ 2 2520 LDY loy 2530 JSR add_vote \ 1 2540 LDA vlo 2550 CLC SEC LDA VLO 2550 LDC SEC SEC LC 2550 LDC SEC SEC SEC SEC SEC SEC SEC SEC SEC SE                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| 1500 loopB 1570 LDT #8 1580 loopC 1590 INY 1600 BNE loopC 1610 DEX 1620 BNE loopB 1630 BCC delay 1640 BNE loopA 1650 STA delay 1660 key1 1670 LDX #6CF 1680 JSR rd key 1690 BCC key2 1700 LDA #24 1710 STA delay 1720 JMP life 1731 key2 1742 LDX #6CF                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | 2370 LDA vlo 2380 SEC 2390 SEC #64 2400 STA vlo 2410 BCS here1 2420 DEC vhi 2430 LDA vhi 2440 CMP #227 2450 BNE here1 2460 LDA #22F 2470 STA vhi 2480 .here1 2490 JSR add_vote \ 3 2500 LDY tempy 2510 JSR add_vote \ 2 2520 LDY loy 2520 LDY LOY 2530 JSR add_vote \ 1 2540 LDA vlo 2550 LDC 2550 LDC #128 2570 STA vlo 2580 BCC here2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 1550 - loopB 1570 LDY #0 1580 - loopC 1590 INY 1600 BNE loopC 1610 DEX 1620 BNE loopB 1630 DEC delay 1640 BNE loopA 1650 STA delay 1660 Key1 1670 LDX #6CF 1680 JSR rd_key 1690 BCC key2 1710 BDA #24 1710 STA delay 1720 JME life 1730 .key2 1740 LDX #6CE 1750 JSR rd_key 1750 BCC key3 1760 LDX #6CE 1750 JSR rd_key 1760 BCC key3 1770 LDA #18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2370 LDA vlo 2380 SEC  2390 SEC  2390 SEC  2400 STA vlo 2410 BCS here1 2420 DEC vhi 2430 LDA vhi 2440 CMP #227 2450 NEW here1 2460 LDA #22F 2470 STA vhi 2480 .here1 2490 JSR add_vote \ 3 2500 LDY tempy 2510 JSR add_vote \ 2 2520 LDY loy 2530 JSR add_vote \ 1 2540 LDA vlo 2550 LCC  2560 ADC #128 2570 STA vlo 2580 BCC here2 2590 NC vhi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 1560 .loopB 1570 LDY #0 1588 .loopC 1598 INY 1680 BNR loopC 1610 DEX 1620 BNE loopB 1630 DEC delay 1640 BNE loopA 1650 STA delay 1660 .key1 1670 LDX #6CF 1680 JSR rd_key 1690 BCC key2 1700 LDA #24 1710 STA delay 1710 STA delay 1720 JMP life 1730 .key2 1744 LDX #6CF 1756 BCC key2 1746 LDX #6CF 1756 BCC key3 1776 LDA #18 1756 BCC key3 1777 LDA #18 1780 STA delay                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 2370 LDA vlo 2380 SEC  2390 SEC  2390 SEC  2400 STA vlo 2410 BCS here1 2420 DEC vhi 2430 LDA vhi 2440 CMP #227 2450 NEW here1 2460 LDA #22F 2470 STA vhi 2480 .here1 2490 JSR add_vote \ 3 2500 LDY tempy 2510 JSR add_vote \ 2 2520 LDY loy 2530 JSR add_vote \ 1 2540 LDA vlo 2550 LCC  2560 ADC #128 2570 STA vlo 2580 BCC here2 2590 NC vhi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 1550 - loopB 1570 LDY #8 1580 - loopC 1590 INY 1600 BNE loopC 1610 DEX 1620 BNE loopB 1630 DEC delay 1640 BNE loopA 1650 STA delay 1660 .key1 1670 LDX #&CF 1680 DSR rd_key 1698 BCC key2 1700 LDA #24 1710 STA delay 1720 JNE life 1730 .key2 1740 LDX #&CF 1730 JR rd_key 1740 LDA #24 1710 STA delay 1710 DA #24 1710 STA delay 1710 LDA #24 1710 STA delay 1730 JNE life 1730 JR rd_key 1760 BCC key3 1770 LDA #18 1780 STA delay 1770 LDA #18                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | 2370 LDA vlo 2380 SEC  2390 SEC  2390 SEC  2400 SEA vlo 2410 BCS herel 2420 DEC vhi 2430 LDA vhi 2440 CMP #827 2450 NDA #827 2450 NDA #827 2460 LDA #827 2470 SEA vhi 2480 .herel 2490 JSR add_votec \ 3 2500 LDY tempy 2510 JSR add_vote \ 2 2520 LDY loy 2530 JSR add_vote \ 1 2550 LDA vlo 2550 LDC 2550 JDA vlo 2550 JCC 2560 JDC #128 2570 STA vlo 2580 BCC here2 2590 JCC vhi 2600 LDA vhi 2600 LDA vhi 2610 CMP #830                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| 1550 - loopB 1570 - LDY #8 1580 - loopC 1590 - INY 1600 - BNE loopC 1610 - DEX 1620 - BNE loopB 1630 - ROW   1640 - BNE loopB 1650 - Keyl 1670 - LDX #4CF 1680 - JSR rd, key 1690 - BCC keyl 1700 - LDA #24 1710 - STA delay 1710 - LDA #24 1710 - STA delay 1710 - LDA #24 1710 - STA delay 1710 - LDA #26 1750 - JSR rd, key 1760 - BCC keyl 1770 - LDA #10 1780 - STA delay 1790 - JNE   1780 - STA delay 178 | 2370 LDA vlo 2380 SEC 2390 SEC #64 2400 SEX wlo 2410 BCS herel 2420 DEC vhi 2430 LDA vhi 2440 CMP #827 2450 NEW herel 2460 LDA #22P 2470 STA vhi 2490 VSR add_voteC \ 3 2500 LDY tempy 2510 JSR add_vote \ 2 2520 LDY Loy 2530 JSR add_vote \ 1 2540 LDA vlo 2550 LDC #128 2570 STA vlo 2580 BCC here2 2590 INC vhi 2600 LDA vhi 2590 INC vhi 2600 LDA vhi 2610 CMP #830 2620 NEW here2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| 1550 - loopB 1570 - LDY #8 1580 - loopC 1590 - INY 1600 - BNE loopC 1610 - DEX 1620 - BNE loopB 1630 - ROW   1640 - BNE loopB 1650 - Keyl 1670 - LDX #4CF 1680 - JSR rd, key 1690 - BCC keyl 1700 - LDA #24 1710 - STA delay 1710 - LDA #24 1710 - STA delay 1710 - LDA #24 1710 - STA delay 1710 - LDA #26 1750 - JSR rd, key 1760 - BCC keyl 1770 - LDA #10 1780 - STA delay 1790 - JNE   1780 - STA delay 178 | 2370 LDA vlo 2380 SEC 2390 SEC #64 2390 SEC #64 2400 SEA vlo 2410 BCS here1 2420 DEC vhi 2430 LDA vhi 2446 CMP #827 2450 NDE here1 2460 LDA #22F 2470 SEA vhi 2480 .here1 2480 .here1 2480 .ba add_votec \ 3 2500 LDY tempy 2510 JSR add_vote \ 2 2520 LDY loy 2530 JSR add_vote \ 1 2550 LDA vlo 2550 LDA vlo 2550 LDC 2550 LDC 2550 ADC #128 2570 SEA vlo 2550 ADC #128 2570 SEA vlo 2600 LDA vhi 2600 LDA vhi 2600 LDA vhi 2610 CMP #830 2620 NDE here2 2630 LDA #228                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 1550 - loopB 1570 - LDY #8 1580 - loopC 1590 - INY 1600 - BNE loopC 1610 - DEX 1620 - BNE loopB 1630 - ROW   1640 - BNE loopB 1650 - Keyl 1670 - LDX #4CF 1680 - JSR rd, key 1690 - BCC keyl 1700 - LDA #24 1710 - STA delay 1710 - LDA #24 1710 - STA delay 1710 - LDA #24 1710 - STA delay 1710 - LDA #26 1750 - JSR rd, key 1760 - BCC keyl 1770 - LDA #10 1780 - STA delay 1790 - JNE   1780 - STA delay 178 | 2370 LDA vlo 2380 SEC 2390 SEC #64 2400 STA vlo 2410 BCS here1 2420 DEC vhi 2430 LDA vhi 2440 CMP #827 2450 NEW here1 2460 LDA #22P 2470 STA vhi 2480 .here1 2490 JSR add_vote( ) 3 2500 LDY tempy 2510 JSR add_vote \ 2 2520 LDY loy 2530 JSR add_vote \ 1 2540 LDA vlo 2550 LDA vlo 2550 LDC TSR vlo 2560 LDY LOY 2550 CLC 2560 ADC #128 2570 STA vlo 2580 BCC here2 2590 INC vhi 2600 LDA vhi 2610 CMP #830 2620 BNE here2 2630 LDA #828                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| 1550 - loopB 1570 - LDY #8 1580 - loopC 1590 - INY 1600 - BNE loopC 1610 - DEX 1620 - BNE loopB 1630 - ROW   1640 - BNE loopB 1650 - Keyl 1670 - LDX #4CF 1680 - JSR rd, key 1690 - BCC keyl 1700 - LDA #24 1710 - STA delay 1710 - LDA #24 1710 - STA delay 1710 - LDA #24 1710 - STA delay 1710 - LDA #26 1750 - JSR rd, key 1760 - BCC keyl 1770 - LDA #10 1780 - STA delay 1790 - JNE   1780 - STA delay 178 | 2376 LDA vlo 2386 SEC 2396 SEC 2396 SEC 2408 STA vlo 2410 BCS here1 2420 DEC vhi 2436 LDA vhi 2446 CMP #827 2456 NNE here1 2466 LDA #22F 2476 STA vhi 2486 .here1 2486 .here1 2486 .ba #ad_vote \ 3 2500 LDY tempy 2510 JSR add_vote \ 2 2526 LDY loy 2530 JSR add_vote \ 1 2556 LDC 2556 LDC 2556 LDC vlo 2556 JDC #128 2576 STA vlo 2580 BCC here2 2590 INC vhi 2600 LDA vhi 2600 LDA vhi 2600 LDA vhi 2600 LDA vhi 2610 CMP #830 2620 NNE here2 2646 STA vhi 2650 ALDR #228 2646 STA vhi 2650 ALDR #228                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| 1500 loops 1570 LDY #9 1580 loopc 1590 INY 1600 BNE loopc 1610 DEX 1620 BNE loops 1630 DEC delay 1640 BNE loops 1650 STA delay 1660 Key1 1670 LDX #ACF 1680 JSR rd_key 1690 BCC key2 1700 LDA #24 1710 STA delay 1710 STA delay 1710 MET STA DELA MET STA DEL MET STA DELA MET ST | 2370 LDA vlo 2380 SEC 2390 SEC #64 2400 STA vlo 2410 BCS here1 2420 DEC vhi 2430 LDA vhi 2440 CMP #227 2450 NEW here1 2460 LDA #22F 2470 STA vhi 2480 .here1 2490 USR add_vote \ 3 2500 LDY tempy 2510 USR add_vote \ 1 2520 LDY loy 2530 JSR add_vote \ 1 2540 LDA vlo 2550 LDC #128 2570 STA vlo 2550 LCC Whi 2560 LDA vlo 2550 LCC BCC here2 2500 LDA whi 2600 LDA vhi 2600 LDA vhi 2600 LDA whi 2600 LDA whi 2610 CMP #230 2620 BNE here2 2630 LDA #28 2640 STA vhi 2650 SRE here2 2630 LDA #28 2640 STA vhi 2650 LDA #28 2660 JSR add_voteC \ 7                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| 1560 .loopB 1570 LDV #0 1588 .loopC 1598 WY 1588 .loopC 1610 DEX 1600 BNE loopB 1630 DEC delay 1640 BNE loopA 1650 STA delay 1660 .keyl 1670 LDX #6CF 1680 JSR rd key 1680 JSR rd key 1700 LDA #24 1710 STA delay 1720 JMP life 1730 .key2 1740 LDX #6CE 1750 JSR rd key 1768 BCC key3 1770 LDA #16 1786 BCC key3 1770 LDA #16 1880 SA key1 1780 STA delay 1790 JSR rd key 1800 .key3 1810 LDX #LEE 1820 JSR rd key 1830 BCC p 1840 LDA #0 1850 STA delay                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | 2376 LDA vlo 2386 SEC 2396 SEC #64 2408 STA vlo 2416 BCS here1 2420 DEC vhi 2430 LDA vhi 2446 CMP #227 2456 BNE here1 2460 LDA #22F 2476 STA vhi 2496 JSR add_voteC \ 3 2506 LDY tempy 2510 JSR add_vote \ 1 2546 LDA vlo 2550 LDY LOY 2530 JSR add_vote \ 1 2546 LDA vlo 2550 LDY LOY 2550 LDC HOP 2550 LDC HOP 2550 LDC #128 2570 STA vlo 2580 BCC here2 2590 LNC vhi 2600 LDA vhi 2610 CMP #330 2620 BNE here2 2630 LDA #228 2640 STA vlo 2650 JCA #28 2640 STA vlo 2650 LDR #626 2630 LDR Here2 2630 LDR Here2 2630 LDR #628 2640 STA vlo 2650 Lhere2 2650 Lhere2 2650 Lhere2 2650 Lhere2 2660 JSR add_voteC \ 7 2670 LDP hyp                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| 1500   loopB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2370 LDA vlo 2380 SEC  2390 SEC  2390 SEC  2400 STA vlo 2410 BCS here1 2420 DEC vhi 2430 LDA vhi 2440 CMP #227 2450 NEW here1 2460 LDA #22F 2470 STA vhi 2480 .here1 2490 USR add_vote \ 3 2500 LDY tempy 2510 USR add_vote \ 1 2520 LDY loy 2530 JSR add_vote \ 1 2560 LDA vlo 2550 LDC #128 2570 STA vlo 2580 BCC here2 2590 LDA vhi 2600 LDA vhi 2600 LDA vhi 2600 LDA vhi 2610 CMP #230 2620 BME here2 2630 LDA #228 2640 STA vhi 2650 SCC Here2 2650 LDA #264 2650 SEC Here2 2650 LDA #265 2660 SEC Here2 2650 LDA #2660 SEC Here2 2650 LDA #2660 SEC HERE2 2650 LDA #2660 SEC HERE2 2650 SEC HERE2 2650 LDA #268 2660 SEC HERE2 2650 LDA #268 2660 SEC HERE2 2660 SEC |
| 1500   loopB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2370 LDA vlo 2380 SEC  2390 SEC  2390 SEC  2400 STA vlo 2410 BCS here1 2420 DEC vhi 2430 LDA vhi 2440 CMP #227 2450 NEW here1 2460 LDA #22F 2470 STA vhi 2480 .here1 2490 USR add_vote \ 3 2500 LDY tempy 2510 USR add_vote \ 1 2520 LDY loy 2530 JSR add_vote \ 1 2560 LDA vlo 2550 LDC #128 2570 STA vlo 2580 BCC here2 2590 LDA vhi 2600 LDA vhi 2600 LDA vhi 2600 LDA vhi 2610 CMP #230 2620 BME here2 2630 LDA #228 2640 STA vhi 2650 SCC Here2 2650 LDA #264 2650 SEC Here2 2650 LDA #265 2660 SEC Here2 2650 LDA #2660 SEC Here2 2650 LDA #2660 SEC HERE2 2650 LDA #2660 SEC HERE2 2650 SEC HERE2 2650 LDA #268 2660 SEC HERE2 2650 LDA #268 2660 SEC HERE2 2660 SEC |
| 1500   loopB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2370 LDA vlo 2380 SEC  2390 SEC  2390 SEC  2400 SEA vlo 2410 BCS herel 2420 DEC vhi 2430 LDA vhi 2440 CMP #827 2450 NEW herel 2460 LDA #82F 2470 SEA vhi 2480 .herel 2490 JSR add_vote \ 2 2500 LDY tempy 2510 JSR add_vote \ 1 2550 LDY LDA vlo 2550 LDA vlo 2550 LDA vlo 2550 LDC #128 2570 STA vlo 2580 BCC here2 2590 LNC whi 2600 LDA vhi 2600 LDA SEA 2600 LDA #228 2640 SEA add_vote \ 7 2670 LDY hiy 2650 LDY Lempy 2650 LDY tempy 2650 LDY tempy 2650 LDY LESSON Add_vote \ 8 2650 LDY LESSON ADD VLO \ 8 2650 LDY LESSON ADD VLO \ 8 2650 LDY LESSON ADD VLO \ 9 2700 JSR Add_vote \ 9                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 1500   loopB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2370 LDA vlo 2380 SEC 2390 SEC #64 2400 STA vlo 2410 BCS here1 2420 DEC vhi 2430 LDA vhi 2440 CMP #827 2450 NEW here1 2460 LDA #22P 2470 STA vhi 2480 .here1 2490 JSR add_vote \ 2 2500 LDY tempy 2510 JSR add_vote \ 1 2540 LDA vlo 2550 LDC 2550 LDC 2550 LDC 2550 LDC 2560 LDA vhi 2600 LDA vhi 2610 CMP #830 2620 BNE here2 2630 LDA vhi 2610 CMP #830 2620 BNE here2 2630 LDA #828 2640 STA vhi 2650 LDA vhi 2650 JDA mere2 2660 JSR add_vote \ 7 2670 LDY hiy 2680 JSR add_vote \ 8 2690 LDY tempy 2700 JSR add_vote \ 9 2710 JSR next                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| 1500   loopB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2376 LDA vlo 2386 SEC 2396 SEC #64 2396 SEC #64 2408 STA vlo 2410 BCS here1 2420 DEC vhi 2436 LDA vhi 2446 CMP #827 2456 NNE here1 2466 LDA #22F 2476 STA vhi 2486 .here1 2496 JSR add_vote \ 2 2506 LDY loy 2510 JSR add_vote \ 1 2556 LDC 2556 LDC 2556 LDC 2556 ADC #128 2576 STA vhi 2660 LDA vhi 2660 JSR add_vote \ 7 27676 LDF hiy 2680 JSR add_vote \ 7 2676 LDF hiy 2680 JSR add_vote \ 8 2690 LDF tempy 2760 JSR add_vote \ 9 2716 JMF next                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 1500   loopB   1570 LDV #8   1580   loopC   1590 RNY   1600 RNE loopC   1610 DEX   1620 RNE loopB   1630 DEC delay   1640 RNE loopA   1650 key1   1670 LDX #4CP   1660 JSR rd_key   1670 LDX #4CP   1670 LDX #4CP   1700 LDA #24   1710 STA delay   1720 JME life   1730 key2   1740 LDX #4CE   1750 JSR rd_key   1750 BCC key3   1770 LDA #10   1780 STA delay   1780 STA delay   1780 STA delay   1780 STA delay   1780 LDA #4CB   1780 STA delay   1800 key3   1810 LDX #4CB   1820 STA delay   1830 SCC p   1840 LDA #0   1850 STA delay   1860 JNP life   1870 STA delay   1880 STA delay   1890 STA delay   1800 ST | 2376 LDA vlo 2386 SEC 2396 SEC 2396 SEC 2396 SEC 2406 STA vlo 2416 BCS here1 2426 DEC vhi 2436 LDA vhi 2446 CMP #227 2456 NEW here1 2466 LDA #22F 2476 STA vhi 2486 .here1 2496 JCA vde \ 2 2506 LDY tempy 2510 JSR add_vote \ 2 2526 LDY loy 2530 JSR add_vote \ 1 2546 LDA vlo 2556 CLC 2556 LCC 2556 DCC 2556 DCC 2566 JCR wlo 2576 STA vlo 2586 BCC here2 2596 INC vhi 2606 LDA vhi 2610 CMP #230 2626 BNE here2 2636 LDA #228 2636 LDA #28 2656 JCR add_vote \ 7 2676 LDY hiy 2689 JSR add_vote \ 7 2676 LDY hiy 2689 JSR add_vote \ 8 2696 LDY tempy 2700 JSR add_vote \ 8 2696 LDY tempy 2700 JSR add_vote \ 9 2716 JMP next 2720 : 2736 .print                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 1500   loopB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2376 LDA vlo 2386 SEC 2396 SEC 2396 SEC 2396 SEC 2406 STA vlo 2416 BCS here1 2426 DEC vhi 2436 LDA vhi 2446 CMP #227 2456 NEW here1 2466 LDA #22F 2476 STA vhi 2486 .here1 2496 JCA vde \ 2 2506 LDY tempy 2510 JSR add_vote \ 2 2526 LDY loy 2530 JSR add_vote \ 1 2546 LDA vlo 2556 CLC 2556 LCC 2556 DCC 2556 DCC 2566 JCR wlo 2576 STA vlo 2586 BCC here2 2596 INC vhi 2606 LDA vhi 2610 CMP #230 2626 BNE here2 2636 LDA #228 2636 LDA #28 2656 JCR add_vote \ 7 2676 LDY hiy 2689 JSR add_vote \ 7 2676 LDY hiy 2689 JSR add_vote \ 8 2696 LDY tempy 2700 JSR add_vote \ 8 2696 LDY tempy 2700 JSR add_vote \ 9 2716 JMP next 2720 : 2736 .print                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| 1500   loopB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2376 LDA vlo 2386 SEC 2396 SEC #64 2396 SEC #64 2406 STA vlo 2410 BCS here1 2426 DEC vhi 2436 LDA vhi 2446 CMP #227 2456 NEW here1 2466 LDA #22F 2476 STA vhi 2480 .here1 2490 USR add_vote \ 3 2576 LDY loy 2530 JSR add_vote \ 1 2560 LDY Loy 2530 JSR add_vote \ 1 2560 LDA vhi 2560 LDA vhi 2600 LDA whi 2600 JSR add_vote \ 7 2670 LDY hiy 2680 JSR add_vote \ 8 2690 LDY tempy 2710 JSR add_vote \ 8 2710 JSR add_vote \ 9 2710 JSR tempy 2750 STX tempy                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 1500   loopB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | 2376 LDA vlo 2386 SEC 2396 SEC 2396 SEC 2396 SEC 2406 STA vlo 2416 BCS here1 2426 DEC vhi 2436 LDA vhi 2446 CMP #227 2456 NEW here1 2466 LDA #22F 2476 STA vhi 2486 .here1 2496 JCA vde \ 2 2506 LDY tempy 2510 JSR add_vote \ 2 2526 LDY loy 2530 JSR add_vote \ 1 2546 LDA vlo 2556 CLC 2556 LCC 2556 DCC 2556 DCC 2566 JCR wlo 2576 STA vlo 2586 BCC here2 2596 INC vhi 2606 LDA vhi 2610 CMP #230 2626 BNE here2 2636 LDA #228 2636 LDA #28 2656 JCR add_vote \ 7 2676 LDY hiy 2689 JSR add_vote \ 7 2676 LDY hiy 2689 JSR add_vote \ 8 2696 LDY tempy 2700 JSR add_vote \ 8 2696 LDY tempy 2700 JSR add_vote \ 9 2716 JMP next 2720 : 2736 .print                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

```
2780 TYA
2790 ASL A
2800 TAY
2810 TAX
2
                                           3020 .nul
3030 STA (scrlo),Y
3040 DEY
                                                 3050 BPL nul
                3050 BPL nul
3060 .fin
3070 LDX tempx
3080 LDY tempy
3090 RPS
3100 .end
3110 ]
3120 ?senile=0:?birth=1
3130 NEXT
3140 OSCLI**SAVE LIFCODE FFFF0900+200 *
+STR$^*(&FFFF0000 OR ret)
3150 END
                     Listing 2
                                                                            10 REM >Life (Life2)
20 REM by Jonathon Harston
30 REM (c) BAU Jan 92
40 REM for B/B+/M/C/E
                     50 :

60 A%=130:IF(USR&FFF4 AND&FFFF00)<>&F

FFF00 PRINT"Turn off Tube.":END

70 IF !&900<>&8A27385 THEN *LOAD LIFC
00 A%=150'(USREFFE ARDEFFFFO) XEF
PFFOO PRINT TUTN Off Tube. ":END
70 IF 18900 XE027385 THEN *LOAD LIFC
00E
80 *K.0
90 IFPAGES-1400 PROCT
100 *PX4,1
110 X%=1:A%=114:CALLEFFF4:*TV0,1
120 MODES VDU23;8202;0;0;0;HIMEM=2200
0:V%=RND(-TIME):C%=KFB:C%=KFF:C%=E900:L%
=8914:C%=E2020:V%=22600:PROCT:C%=1690:L%
=8914:C%=E2020:V%=22600:PROCT:C%=1691:F%=
130 A%=C%DV256:CALLZ%:ONERROR IFFNx O
SCLI*FX4*:END
140 REFEAT:FROCE:IF(%=18 PROCO
150 UNTILFALSE:END
160 BEFFROCY:VDU28;64;31,79,0,17,129,1
70,11:FRINTAB(5,2)*"IHFE*TAB(2,5)*P - p
ause*TAB(2,7)*O - resume*TAB(2,9)*Q - qu
it*TAB(2,1)*3 - Fast*:VDU26,17,1,17,128
170 FRINTTAB(66,25)* Gen: 0000**TAB(X
*X,V%)CHBS(FNy+253):IC%=230303030:A%=V%D
IV256:CALLZ%:*FX229,1
180 CALLUX:*FX229,1
180 CALCUX:*FX229,1
180 CALCUX:*FX229,1
180 CALCUX:*FX229,1
180 CALCUX:*FX239,1
180 CALCUX:*FX39,1
180
```

ROC 220 DATA 0,0,0,0,0,0,0,0,0,24,60,110,7

```
8,110,60,24,0,0,24,E2C,E24,E2C,24,0
230 DEFFROCE:VDUI7,128,28,64,31,79,0,1
7,129,17,6,12:FRINTTAB(5,1)*LIFE*TAB(2,3)
)*KEYS:-"" Z,X,:/,-"" move cursor:
" SPACE BAR -"" set cell*'" DELET
E -"" remove cell*'" R - random*'"
A - age (",256-?EAFF;")"
240 PRINT'" D - Death O*;:FROCd
250 PRINT'" F,B - change"" colours*
"" RETURN -"" start*"" L - Load*'
"S - Save"
260 VDU26,17,1,17,128;X%=31:Y%=15:PRIN
TTAB(X%,Y%)CHR$(FNP+251);:REPEAT
270 IFINNEY-101 B%=(B%+1)AND7:VDU19,0,
           280 IFINKEY-68 F%=(F%+1)AND7:VDU19,1,F
 %;0;
290 IFINKEY-980RINKEY-26 PROCm(63,0)
300 IFINKEY-670RINKEY-122 PROCm(1,0)
310 IFINKEY-73 ANDNOTINKEY-1 ORINKEY-5
8 PROCm(0,31)
320 IFINKEY-1050RINKEY-42 PROCm(0,1)
330 IFINKEY-99 PROCp(?&AFF)
340 IFINKEY-990 PROCp(?&AFF)
340 IFINKEY-990RINKEY-97 PROCp(0)
350 IFINKEY-980 A%=c%DIV256:CALLC%:VDU2
5,0,31,63,0;0,0:PROCC;PRINTMAB(K; %);0:RG$251
360 IFINKEY-52 REPEAT PROCm(RND AND63,
RND AND31):PROCp(RND(255)):UNTILNOTINKEY
-52
  -52
370 Q%=INKEY(20)ANDEDF:IFQ%=83 PROCS
380 IFQ%=76 PROCI
390 IFQ%=68 ?EAFE=NOT?EAFE:COLOURS:COL
OURL29:PRINTTAB(77,18);:PROCS:COLOURS:COL
LOURL28
400 IFQ%=65 PROCS
410 UNTILQ%=100RINKEY-74:IFINKEY-74 PR
OCY
  OCY
420 ENDPROC
430 DEPPROCd:IF?&AFE PRINT"n " ELSE PR
    440 ENDPROC
450 DEFPROCm(x%, y%):PRINTTAB(X%, Y%) CHR
$(FNp+253);:X%=(X%+X%)AND53:Y%=(Y%+y%)AN
    D31: PRINTTAB (X%, Y%) CHR$ (FNp+251); : ENDPRO
  C
468 DEFFNp=(?(c%+X%+64*Y%)<-8)AND1
478 DEFFRCCp(C%):?(c%+X%+64*Y%)=c%:PRO
Cm(0,0):ENDPROC
480 DEFFNX:PROCW:IFFER:17 PRINT*Finish
?(Y/N)*:IF(GET ANDEDF)=89 PROCX:OSCLI*F
X4*:END
498 IFERC*17 REPORT:Q%=GET
500 PROCX:=INKEY-1
510 DEFFRCCW:VDU28,64,31,79,30:COLOUR1
29:COLOUR0:CLS:ENDOPROC
520 DEFFRCCX:CLS:VDU26:COLOUR128:COLOUR
11:ENDPROCX:CLS:VDU26:COLOUR128:COLOUR1
18:ENDPROCX:CLS:VDU26:COLOUR128:COLOUR1
   R1:ENDPROC
           530 DEFPROCa:PROCw:INPUT"Max age: "Q%:
 600 DEFPROCT: *KEY0 F.X%=0TO(TOP-PAGE)S
.4:X%:&1400=X%:PA.:N.:PA.=&1400|MO.|MRUN
    610 *FX225.1
620 *FX138,0,128
630 END
```

Notes

#### A5000

#### Available NOW! The NEW Acorn A5000 including RISCOS 3!

Acorn A5000 1MFD

1Mb RAM, 1.6Mb floppy drive & RISCOS 3 (Available Early 1992)

Acorn A5000 2MHD £1499

2Mb RAM (upgradeable to 4Mb), 40Mb IDE hard disc, 1.6Mb floppy drive, RISCOS 3 and Acorn Multi-Sync monitor. Super Value!

Acorn A5000 2MHD £1529

LEARNING CURVE SYSTEM As above but also includes Acorn Desktop Publisher, 1st Word Plus, Genesis Plus, PC Emulator, Pacmania, introductory video and guidance on the National Curriculum

Acorn A5000 2MHD £1759 LEARNING CURVE PRINTER SYS As above but also includes an Acorn Ink Jet 300dpi Printer.

#### A3000

| BBC A3000                    | £599     |
|------------------------------|----------|
| BBC A3000 Learning Curve     | £639     |
| This package includes Mon    | Std, 1st |
| Word Plus, PC Emulator, Ge   | nesis+,  |
| Pacmania, introductory video |          |
| guidance on the Naional Cur  | riculum  |
| with Acorn Colour Monitor    | £849     |

BBC A3000 Lng Crv Ptr Sys £1089 As above but inc Acorn Colour Monitor & 300dpi Ink Jet Printer

BBC A3000 Special Access £679 This machine includes the serial and user/analogue upgrades for immediate connection of special need peripherals ie Conc Keybd etc with Acorn Colour Monitor £1049

All A3000 computers purchased from us will be upgraded to 2Mb RAM free of charge

#### A400/A500

Archimedes A410/1 With 2Mb RAM & 20Mb Hard Disc

Archimedes A420/1 £1099 With 4Mb RAM, 40Mb Hard Disc

Archimedes A420/1 £1109 LEARNING CURVE

As A3000 Learning Curve but also incl Acorn DTP, 4Mb RAM 40Mb HD

**Archimedes A540** £2495 With 8Mb RAM, 100Mb HD, ARM3

Please call us if you are offered a better price elsewhere, we will do our best to match it.

Winter Opening Hours MON-SAT, 10.00-20.00hrs

#### **RAM Upgrades**

| A3000                  |      |
|------------------------|------|
| Up to 2Mb RAM          | £55  |
| Up to 4Mb RAM          | £156 |
| A5000                  |      |
| Up to 2Mb RAM          | £129 |
| A400                   |      |
| 1Mb RAM                | £39  |
| 2Mb RAM                | £75  |
| 3Mb RAM                | £105 |
| Up to 8Mb RAM from 4Mb | £649 |
| A540                   |      |

#### 4Mb RAM

(This upgrade is a module. Further modules can be added to provide 12 & 16Mb RAM Totals)

#### Standard Monitors

| Acorn Colour            | £200 |
|-------------------------|------|
| Standard Colour Monitor | £179 |
| Microvitec CUB 3000     | £199 |
| Philips CM8833 II       | £209 |
| Philips BM7502 Mono     | £75  |

#### **MultiScan Monitors**

| EIZO 9060SZ                     | £419 |
|---------------------------------|------|
| EIZO 9070SZ                     | £629 |
| Taxan MultiVision 775           | £389 |
| Taxan 795A (Free VIDC Enhancer) | £469 |
| Taxan Viking II                 | £749 |

#### **Hard Discs**

**£Call** 

IDE Hard disc controllers

IDE

| Orion, Serial Port, Beebug                                                                                                                  |                             |
|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|
| 20 Mb Internal Hard Disc                                                                                                                    | £79                         |
| 40 Mb Internal Hard Disc                                                                                                                    | £139                        |
| 90 Mb Internal Hard Disc                                                                                                                    | £219                        |
| 120 Mb Internal Hard Disc                                                                                                                   | £399                        |
| 160 Mb Internal Hard Disc                                                                                                                   | £499                        |
| 200 Mb Internal Hard Disc                                                                                                                   | £599                        |
| 450 Mb Internal Hard Disc                                                                                                                   | £999                        |
| SCSI                                                                                                                                        |                             |
|                                                                                                                                             |                             |
| SCSI Interfaces                                                                                                                             | £Call                       |
| SCSI Interfaces<br>Acorn, Morley, Serial Port                                                                                               | £Call                       |
|                                                                                                                                             | £Call<br>£99                |
| Acorn, Morley, Serial Port                                                                                                                  |                             |
| Acorn, Morley, Serial Port<br>20 Mb Internal Hard Disc                                                                                      | £99                         |
| Acorn, Morley, Serial Port<br>20 Mb Internal Hard Disc<br>40 Mb Internal Hard Disc                                                          | £99<br>£159                 |
| Acorn, Morley, Serial Port<br>20 Mb Internal Hard Disc<br>40 Mb Internal Hard Disc<br>90 Mb Internal Hard Disc                              | £99<br>£159<br>£239         |
| Acorn, Morley, Serial Port<br>20 Mb Internal Hard Disc<br>40 Mb Internal Hard Disc<br>90 Mb Internal Hard Disc<br>120 Mb Internal Hard Disc | £99<br>£159<br>£239<br>£429 |

#### **Printers**

Please call for external units

| Citizen 120D+                 | £115  |
|-------------------------------|-------|
| Citizen 124D                  | £165  |
| Citizen Swift 9               | £162  |
| Citizen Swift 24              | £225  |
| Citizen Swift 24e             | £Call |
| Citizen Swift Colour Kit      | £35   |
| Citizen Swift 32K Buffer Chip | £10   |
| Canon BJ-10e Bubble Jet       | £219  |
| Canon BJ-300 Bubble Jet       | £399  |
| Canon BJ-330 Bubble Jet       | £459  |
| Epson Printers (Esc P/2) etc  | £Call |
| HP DeskJet 500                | £329  |
| HP LaserJet IIIP              | £739  |
|                               |       |

#### **CC Laser Direct**

| Laser Direct (Qume)         | £859  |
|-----------------------------|-------|
| Laser Direct HiRes4 (LBP-4) | £999  |
| Laser Direct HiRes8 (LBP-8) | £1319 |

#### **Hardware Upgrades**

| 5.25" Ext. floppy disc I/F A400  | £30          |
|----------------------------------|--------------|
| 5.25" Ext. floppy disc I/F A3000 | £30          |
| 5.25" Ext. floppy disc cable     | £15          |
| Aleph 1 ARM 3 Upgrade            | £399         |
| Dongle Dangle                    | £6           |
| Dust cover (Keybd + Monitor)     | £12          |
| Econet Module                    | £46          |
| Floating Point Exp Card          | £449         |
| Graphics Enhancer                | £169         |
| Hawk V9 Video Digitiser          | £199         |
| I/O Expansion Card               | £79          |
| Keyboard Extender                | £8           |
| Midi Upgrade to I/O Exp. Card    | £27          |
| Midi Expansion Card              | £65          |
| A3000 Monitor Stand              | £24          |
| Mouse Extender                   | £8           |
| Mouse (New style)                | £40          |
| Micro Mouse (Clares)             | £29          |
| Scanlight Scanners               | <b>£Call</b> |
| Junior, 256, Wide, Professiona   |              |
| VIDC Enhancer                    | £29          |
| Serial Upgrade A3000             | £19          |
| User & Midi Podule A3000         | £46          |
|                                  |              |

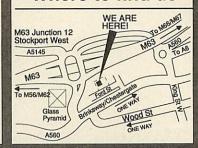
#### Books Archi Assembly Language £14.95

|         | Archi First Steps              | £9.95  |
|---------|--------------------------------|--------|
|         | Archi Operating System         | £14.95 |
|         | C: A Dabhand Guide             | £14.95 |
| ĺ       | The above books have accompany | nying  |
|         | discs add £7                   |        |
|         | A3000 Technical Guide          | £29.95 |
|         | A540/A5000 Tech Guide (ea)     | £65.00 |
|         | Acorn DTP Adv User Guide       | £14.95 |
| li<br>V | Basic V: A Dabhand Guide       | £9.95  |
|         | BBC Basic Guide (Acorn)        | £19.95 |
|         | Budget DTP                     | £12.95 |
| i       | DTP Seeds (4Mation)            | £8.45  |
|         | Master 128 Ref. 1&2 (ea.)      | £14.95 |
| ì       | RISCOS PRM's                   | £79.00 |
| ì       | RISCOS Style Guide             | £9.95  |
| ĺ       | 1st Word+ Manual (Acorn)       | £10.00 |
|         | Acorn DTP Manual (Acorn)       | £10.00 |
|         | AASM Manual (Acorn)            | £10.00 |
|         | ANSI C v4 Manual (Acorn)       | £25.00 |
|         |                                |        |

#### **Terms**

UK residents add 17.5% VAT to all prices except books. Carriage is free in mainland UK, else where at cost. Prices and manufacturers specifications subject to change without notification. Goods offered subject to being unsold and/or available. Goods not offered on trial basis. Restocking fee on non-defective returns.

#### Where to find us



#### Software

| APPLICATIONS                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
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| Armadeus (Clares)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | £59.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Art Works (CC)<br>ANSI C v3 (Acorn)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | £Call                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| ANSI C V3 (Acom)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | £118.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Arc DFS (Dabs)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | £21.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| ArcComm 2 (Logotron)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | £49.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| ArcLight (Ace)<br>ArcTerm 7 (Serial Port)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | £37.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| ADCtict (AD)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | £58.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| ARCtist (4D) Artisan 2 (Clares) Atelier (Minerva )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | £17.95<br>£42.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Artisan 2 (Clares)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | 142.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Atelier (Minerva )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | £69.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Clip Art Collection (Gra Fact)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | £18.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Compression (CC) Desktop C v4 (Acom)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | £45.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Desktop C v4 (Acom)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | £188.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Easiword (Willielva)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | £28.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Easy Writer (Icon Tech)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | £118.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Equasor (CC)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | £38.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Euclid 2 (Ace)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | £45.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Equasor (CC) Euclid 2 (Ace) First Word Plus v2 (Acorn)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | £64.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Flexifile Database (Minerva)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | £97.95<br>£8.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Font FX (DataStore)<br>Genesis 2 (Oak Solutions)<br>Graphbox (Pro (Minerva)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | £8.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Genesis 2 (Oak Solutions)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | £98.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Graphbox Pro (Minerva)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | £Call                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Hearsay (Beebug)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | £51.95<br>£124.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Impression v2.13 (CC)<br>Impression Junior (CC)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | £124.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 168 95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Impression Bus Supp (CC)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | £41.95<br>£21.95<br>£74.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Investigator v2 (Serial Port)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | £21.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| ISO Pascal Rel.2 (Acom)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | £74.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Microstudio (EMR)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 179 95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Impression Bus Supp (CC) Investigator v2 (Serial Port) ISO Pascal Rel.2 (Acom) Microstudio (EMR) Mogul (Ace)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | £14.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Multistore v2 (Minerva)<br>PC Emulator V 1.6 (Acom)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   | £191.95 l                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | £86.95<br>£Call<br>£75.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | £Call                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Poster (4Mation)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | £75.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Presenter 2 Hotlink (Ling)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | £34.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| PrimeArt (Minerva)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | £79.95<br>£12.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Printer JX, PJ, CA (ACE)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | £12.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| PipeDream 4 (Colton) Poster (4Mation) Presenter 2 Hotlink (Ling) Primed XI, PJ, CA (ACE) Pro Artisan (Clares) Render Bender v2 (Clares) Revelation (Logotron)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | £69.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Hender Bender v2 (Clares)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | £95.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Revelation (Logotron) Rhapsody v2 (Clares) Schema (Clares) ShapeFX (Data Store)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | £65.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Rhapsody v2 (Clares)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | £45.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Schema (Clares)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | £89.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| ShapeFX (Data Store)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | £8.65                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| ShowPage (CC)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | £116.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| SmArt                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | £116.95<br>£53.95<br>£21.95<br>£21.95<br>£110.95<br>£149.95<br>£14.95<br>£45.95<br>£36.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Snippet (4Mation)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | £21.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Splice (Ace)<br>Squirrel Database (Dig Ser)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | £21.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Squirrel Database (Dig Ser)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | £110.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Studio 24+ (EMR)<br>Superior Speech!<br>Tracer (Mid Gra)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | £149.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Superior Speech!                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | £14.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Tracer (Mid Gra)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | £45.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Tracker (Mid Carl) Tracker (Serial Port) Tween (Ace) TWO (ICS) TWO (ICS) GAMES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | £36.95<br>£21.95<br>£19.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Tween (Ace)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | £21.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| TWO (ICS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | £19.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Worra CAD (Oak)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | £74.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| GAMES                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | 21 4.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Apocolypse (4D)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | £20.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Apocolypse (4D)<br>Arcade Soccer (4D)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | £14.95<br>£14.95<br>£15.95<br>£14.95<br>£20.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Ballarena (Eterna)<br>Bambuzle (Arxe)<br>Blastron (Eterna)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | £14 95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Bambuzle (Arxe)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | £15.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Blastron (Fterna)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | 614 95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Blitz (Arxe)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | £20.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Boogie Buggy (4D)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | £16.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Boogle Buggy (4D) Boxing Manager (Krisalis)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | 610.05                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Bouncer (PTEM)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | £19.95<br>£15.95<br>£17.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Bouncer (RTFM)<br>Break 147 & Superpool (4D)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | 617.05                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Bubble Fair (Eterna)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | £14.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Bubble Fair (Eterna) Bug Hunt, MoonDash (Min) Bug Hunt in Space (Minerva) Chess 3D (Micro Power)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | £14.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Bug Hunt in Space (Minerya)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | £14.95<br>£14.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Chose 3D (Micro Power)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | £13.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Checks Away 2 (4D)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | C16.05                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Chocks Away 2 (4D) Chocks Away 2 (4Th) Chocks Away 2 (4Dh) Chocks Away 2 (4Dh)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        | £16.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Chocks 2 Compordium (4D)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Chocks 2 Compendium (4D)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | £13.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Chuck Book (Krigalic)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | £26.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Chuck Rock (Krisalis)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | £26.95<br>£20.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Chuck Rock (Krisalis) Crisis (CIS)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | £26.95<br>£20.95<br>£14.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Chuck Rock (Krisalis)<br>Crisis (CIS)<br>Drop Ship (4D)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               | £26.95<br>£20.95<br>£14.95<br>£13.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Chuck Rock (Krisalis) Crisis (CIS) Drop Ship (4D) Elite (Hybrid)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | £26.95<br>£20.95<br>£14.95<br>£13.95<br>£32.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Chuck Rock (Krisalis) Crisis (CIS) Drop Ship (4D) Elite (Hybrid) Enter the Realm (4D)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | £26.95<br>£20.95<br>£14.95<br>£13.95<br>£32.95<br>£20.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Chuck Rock (Krisalis) Crisis (CIS) Drop Ship (4D) Elite (Hybrid) Enter the Realm (4D) Enthar Seven                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | £26.95<br>£20.95<br>£14.95<br>£13.95<br>£32.95<br>£20.95<br>£21.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Chuck Rock (Krisalis) Crisis (CIS) Drop Ship (4D) Elite (Hybrid) Enter the Realm (4D) Enthar Seven                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | £26.95<br>£20.95<br>£14.95<br>£13.95<br>£32.95<br>£20.95<br>£21.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Chuck Rock (Krisalis) Crisis (CIS) Drop Ship (4D) Elite (Hybrid) Enter the Realm (4D) Enthar Seven                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | £26.95<br>£20.95<br>£14.95<br>£13.95<br>£32.95<br>£20.95<br>£21.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Chuck Rock (Krisalis) Crisis (CIS) Drop Ship (4D) Elite (Hybrid) Enter the Realm (4D) Enthar Seven                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | £26.95<br>£20.95<br>£14.95<br>£13.95<br>£32.95<br>£20.95<br>£21.00                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Chuck Rock (Krisalis) Crisis (CIS) Drop Ship (4D) Elite (Hybrid) Enter the Realm (4D) Enthar Seven E-Type, X100Mis, Des, each (4E Fine Racer (Eterna) Holed Out, XCse1/2, Des each Hostages (Superior Software)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | £26.95<br>£20.95<br>£14.95<br>£13.95<br>£32.95<br>£20.95<br>£21.00<br>0)£13.95<br>£13.95<br>£13.95<br>£13.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Chuck Rock (Krisalis) Crisis (CIS) Drop Ship (4D) Elite (Hybrid) Enter the Realm (4D) Enthar Seven E-Type, X100Mis, Des, each (4E Fine Racer (Eterna) Holed Out, XCse1/2, Des each Hostages (Superior Software) Inertia (4D)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | £26.95<br>£20.95<br>£14.95<br>£13.95<br>£32.95<br>£21.00<br>0)£13.95<br>£13.95<br>£13.95<br>£13.95<br>£13.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Chuck Rock (Krisalis) Crisis (CIS) Drop Ship (4D) Elite (Hybrid) Enter the Realm (4D) Enthar Seven E-Type, X100Mis, Des, each (4E Fine Racer (Eterna) Holed Out, XCse1/2, Des each Hostages (Superior Software) Inertia (4D)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | £26.95<br>£20.95<br>£14.95<br>£13.95<br>£32.95<br>£21.00<br>£13.95<br>£13.95<br>£13.95<br>£13.95<br>£13.95<br>£13.95<br>£25.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Chuck Rock (Krisalis) Crisis (CIS) Drop Ship (4D) Elite (Hybrid) Enter the Realm (4D) Enthar Seven E-Type, X100Mis, Des, each (4E Fine Racer (Eterna) Holed Out, XCse1/2, Des each Hostages (Superior Software) Inertia (4D)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          | £26.95<br>£20.95<br>£14.95<br>£13.95<br>£32.95<br>£21.00<br>£13.95<br>£13.95<br>£13.95<br>£13.95<br>£13.95<br>£13.95<br>£13.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Chuck Rock (Krisalis) Crisis (CIS) Drop Ship (4D) Elite (Hybrid) Enter the Realm (4D) Enthar Seven E-Type, X100Mis, Des, each (4E Fine Racer (Eterna) Holed Out, XCse1/2, Des each Hostages (Superior Software) Inertia (4D) Interdictor 2 (Clares) Iron Lord (Cygnus) J. Khan Squash (Krisalis)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | £26.95<br>£20.95<br>£14.95<br>£13.95<br>£20.95<br>£21.00<br>0)£13.95<br>£13.95<br>£13.95<br>£13.95<br>£25.95<br>£20.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Chuck Rock (Krisalis) Crisis (CIS) Drop Ship (4D) Elite (Hybrid) Enter the Realm (4D) Enthar Seven E-Type, X100MIs, Des, each (4E Fine Racer (Eterna) Holed Out, XCse1/2, Des each Hostages (Superior Software) Inertia (4D) Interdictor 2 (Clares) Iron Lord (Cygnus) J. Khan Squash (Krisalis) Lemminos (Krisalis)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | £26.95<br>£20.95<br>£14.95<br>£13.95<br>£20.95<br>£21.00<br>0)£13.95<br>£13.95<br>£13.95<br>£13.95<br>£25.95<br>£20.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Chuck Rock (Krisalis) Crisis (CIS) Drop Ship (4D) Elite (Hybrid) Enter the Realm (4D) Enthar Seven E-Type, X100MIs, Des, each (4E Fine Racer (Eterna) Holed Out, XCse1/2, Des each Hostages (Superior Software) Inertia (4D) Interdictor 2 (Clares) Iron Lord (Cygnus) J. Khan Squash (Krisalis) Lemminos (Krisalis)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | £26.95<br>£20.95<br>£14.95<br>£32.95<br>£21.09<br>£21.00<br>£13.95<br>£13.95<br>£13.95<br>£13.95<br>£13.95<br>£13.95<br>£25.95<br>£20.95<br>£20.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Chuck Rock (Krisalis) Crisis (CIS) Drop Ship (4D) Elite (Hybrid) Enter the Realm (4D) Enthar Seven E-Type, X100Mis, Des, each (4E Fine Racer (Eterna) Holed Out, XCset1/2, Des each Hostages (Superior Software) Inertia (4D) Interdictor 2 (Clares) Iron Lord (Cygnus) J. Khan Squash (Krisalis) Lemmings (Krisalis) Loopz (Audiogenic) Mad Prof Marnarty (Krisalis)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | £26.95<br>£20.95<br>£14.95<br>£13.95<br>£21.95<br>£21.95<br>£21.95<br>£13.95<br>£13.95<br>£13.95<br>£13.95<br>£25.95<br>£20.95<br>£20.95<br>£20.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Chuck Rock (Krisalis) Crisis (CIS) Drop Ship (4D) Elite (Hybrid) Enter the Realm (4D) Enthar Seven E-Type, X100Mis, Des, each (4E Fine Racer (Eterna) Holed Out, XCset1/2, Des each Hostages (Superior Software) Inertia (4D) Interdictor 2 (Clares) Iron Lord (Cygnus) J. Khan Squash (Krisalis) Lemmings (Krisalis) Loopz (Audiogenic) Mad Prof Marnarty (Krisalis)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | £26.95<br>£20.95<br>£14.95<br>£13.95<br>£21.95<br>£21.95<br>£21.95<br>£13.95<br>£13.95<br>£13.95<br>£13.95<br>£25.95<br>£20.95<br>£20.95<br>£20.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
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| Chuck Rock (Krisalis) Crisis (CIS) Drop Ship (4D) Elite (Hybrid) Enter the Realm (4D) Enthar Seven E-Type, X100Mis, Des, each (4E Fine Racer (Eterna) Holed Out, XCse1/2, Des each Hostages (Superior Software) Inertia (4D) Interdictor 2 (Clares) Iron Lord (Cygnus) J. Khan Squash (Krisalis) Loopz (Audiogenic) Mad Prof Marnarty (Krisalis) Mag Scrolls Adventures Manchester Uld Europe (Krisalis) Manchester Uld Europe (Krisalis)                                                                                                                                                                                                                                                                                                                                                                                                                             | £26.95<br>£20.95<br>£13.95<br>£21.95<br>£21.00<br>()£13.95<br>£13.95<br>£13.95<br>£13.95<br>£13.95<br>£25.95<br>£20.95<br>£20.95<br>£20.95<br>£20.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Chuck Rock (Krisalis) Crisis (CIS) Drop Ship (4D) Elite (Hybrid) Enter the Realm (4D) Enthar Seven E-Type, X100Mls, Des, each (4E Fine Racer (Eterna) Holed Out, XCse1/2, Des each Hostages (Superior Software) Inertia (4D) Interdictor 2 (Clares) Iron Lord (Cygnus) J. Khan Squash (Krisalis) Lemmings (Krisalis) Loopz (Audiogenic) Mad Prof Mariarty (Krisalis) Mag Scrolls Adventures Manchester Utd Europe (Krisalis Master Break (Superior) MicroDrive 3D Golf, USA Cse ea                                                                                                                                                                                                                                                                                                                                                                                    | £26.95<br>£20.95<br>£13.95<br>£21.95<br>£21.00<br>()£13.95<br>£13.95<br>£13.95<br>£13.95<br>£13.95<br>£25.95<br>£20.95<br>£20.95<br>£20.95<br>£20.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Chuck Rock (Krisalis) Crisis (CIS) Drop Ship (4D) Elite (Hybrid) Enter the Realm (4D) Enthar Seven E-Type, X100Mls, Des, each (4E Fine Racer (Eterna) Holed Out, XCse1/2, Des each Hostages (Superior Software) Inertia (4D) Interdictor 2 (Clares) Iron Lord (Cygnus) J. Khan Squash (Krisalis) Lemmings (Krisalis) Loopz (Audiogenic) Mad Prof Mariarty (Krisalis) Mag Scrolls Adventures Manchester Utd Europe (Krisalis Master Break (Superior) MicroDrive 3D Golf, USA Cse ea                                                                                                                                                                                                                                                                                                                                                                                    | £26.95<br>£20.95<br>£13.95<br>£20.95<br>£21.00<br>£13.95<br>£13.95<br>£13.95<br>£13.95<br>£13.95<br>£20.95<br>£20.95<br>£15.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£10.95<br>£1 |
| Chuck Rock (Krisalis) Crisis (CIS) Drop Ship (4D) Elite (Hybrid) Enter the Realm (4D) Enthar Seven E-Type, X100Mls, Des, each (4E Fine Racer (Eterna) Holed Out, XCse1/2, Des each Hostages (Superior Software) Inertia (4D) Interdictor 2 (Clares) Iron Lord (Cygnus) J. Khan Squash (Krisalis) Lemmings (Krisalis) Loopz (Audiogenic) Mad Prof Mariarty (Krisalis) Mag Scrolls Adventures Manchester Utd Europe (Krisalis Master Break (Superior) MicroDrive 3D Golf, USA Cse ea                                                                                                                                                                                                                                                                                                                                                                                    | £26.95<br>£14.95<br>£13.95<br>£20.95<br>£21.00<br>£13.95<br>£13.95<br>£13.95<br>£13.95<br>£13.95<br>£25.95<br>£20.95<br>£20.95<br>£20.95<br>£15.95<br>£15.95<br>£15.95<br>£15.95<br>£15.95<br>£15.95<br>£15.95                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
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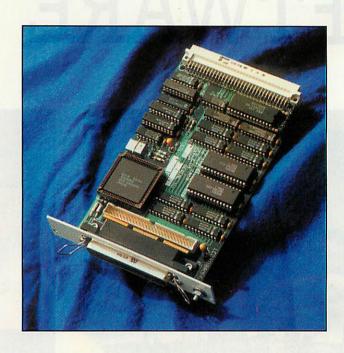
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The fastest hard disc interface for the Archimedes and A3000

Systems from as little as £219 (Archimedes) & £289 (A3000)

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One year ago, Morley Electronics decided to design and build a new SCSI interface card. The design objective was quite simple....to build the best. We believe that by manufacturing the fastest SCSI interface, utilising a quality four layer board and also making it completely ANSI Level 2 compliant, we have achieved our aim

Two 16 bit interfaces are available. Our standard interface is extremely fast but for those requiring even faster data transfer, our cached card offers sustained transfer speeds up to 3790 KB/s (compared with a maximum sustained transfer speed of 2121 KB/s for our standard card).

The A3000 expansion card comes in a colour coordinated steel case which fixes to the rear of the A3000. The hard disc mechanism is enclosed in a separate steel case (also colour coordinated) with switch mode power supply and fan to ensure that the unit remains cool.

The 400 series expansion card occupies a single expansion socket and can support both internally and externally mounted devices. It is fully compatible and will coexist with any existing ST506 drive.

Each expansion card will support up to seven SCSI devices including hard discs, tape streamers, solid state discs, CD ROM players etc. (providing the appropriate software to drive them is installed).

The SCSI system is designed to comply fully with the ANSI X3.131-1986 standard and to give full Acorn RISC OS compatibility.

Full technical information (including data transfer speeds) are available on request.

#### **INTERFACES\***

A3000 SCSI Interface £169 400 SCSI Interface £149

#### SCSI DISK DRIVES\*

Including SCSI interface, cable & leads. A3000 drives also include drive case and switch mode power supply.

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| A3000 20MB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | £289  |
| A3000 50MB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     | £379  |
| A3000 100MB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | £499  |
| 400 Internal 20MB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | £219  |
| 400 Internal 50MB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              | £299  |
| 400 Internal 100MB                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | £449  |
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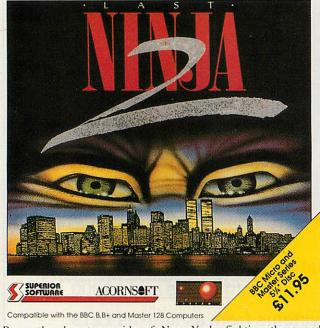
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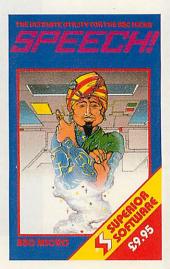
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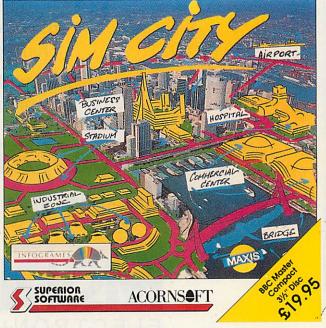
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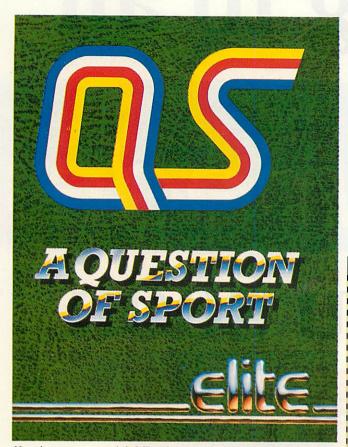
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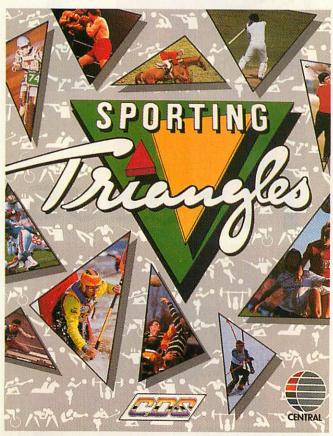
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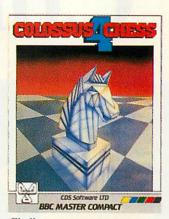
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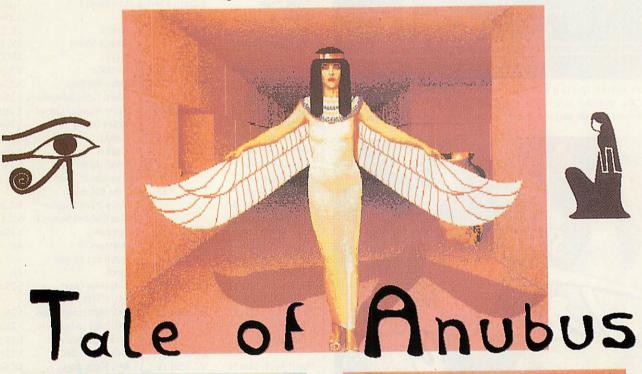
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| Football Fortunes         | MC 3.5in £8       | Superior Golf                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 10   |       |  |
| Sporting Triangles        | MC 3.5in £8       | Tank Attack                   | MC 3.5in                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |       |  |
| Trivial Pursuit           | 5.25in £10        | Euclid 3D Draw                |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | 45   |       |  |
| Baby Boomer               | 5.25in £10        | Ricochet                      | MC 3.5in                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |       |  |
| Young Player              | 5.25in £10        | Last Ninja 2                  | The state of the s | £5   |       |  |
| Inertia                   | MC 3.5in £8       |                               | 5.25in                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | £5   |       |  |
| Colossus Chess            | MC 3.5in £8       | Inertia                       | MC 3.5in                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | £8   |       |  |
| Play it Again Sam 1       | Tape £5           | Arcade Soccer                 | MC 3.5in                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |      |       |  |
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| Play it Again Sam 2       | MC 3.5in £8       | Portfolio                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | £3   |       |  |
| Play it Again Sam 3       | MC 3.5in £8       | Sideways Ram                  |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | £3   |       |  |
| Tape BBC micro            | £5                | Acorn Table Adventures        | 5.25in                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | £3   |       |  |
| Play it Again Sam 4       | MC 3.5in £8       | Acorn Number Chaser           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                | £3   |       |  |
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| Play it Again Sam 5       | MC 3.5in £8       | Pazazz                        | 5.25in                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | £3   |       |  |
| Play it Again Sam 6       | MC 3.5in £8       | Crack It                      | 5.25in                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | £3   |       |  |
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| Play it again Sam 7       |                   | Question of Sport             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |       |  |
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| Play it Again Sam 8       |                   | Steve Davis Snooker           | MC 3.5in                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | £8   |       |  |
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| Play it Again Sam 9       |                   | Squeeze                       | 5.25in                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | £3   |       |  |
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| Play it Again Sam 11      | MC 3.5in £8       | BAU View Chart                | 5.25in                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | £3   |       |  |
| Tape BBC micro            | £5 🔲              | BAU ITEMS                     |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |      |       |  |
| Play it Again Sam 13      | MC 3.5in £8       | BAU 1988 compilation          | 5.25in                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | £3   |       |  |
| Tape BBC micro            | £5 🔲              | BAU 1987 compilation          | 5.25in                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | £3   |       |  |
| Tape Electron             | £5 🔲              | BAU Education disc            | 5.25in                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | £3   |       |  |
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| Play it Again Sam 14      | MC 3.5in £8       | BAU blank discs               | 5.25in                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |      |       |  |
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| Tape BBC micro            | £5 🔲              | BAU Graphics disc             | 5.25in                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | £3   |       |  |
|                           | MC 3.5in £8       | <b>BAU Graphics Utilities</b> | 5.25in                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         | £3   |       |  |
| Sim City                  | MC 3.5 £8         | BAU UserDump                  | Rom                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | £3   |       |  |
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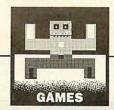
near you soon!







Actual screen shots. Full parallax and 3D movement.



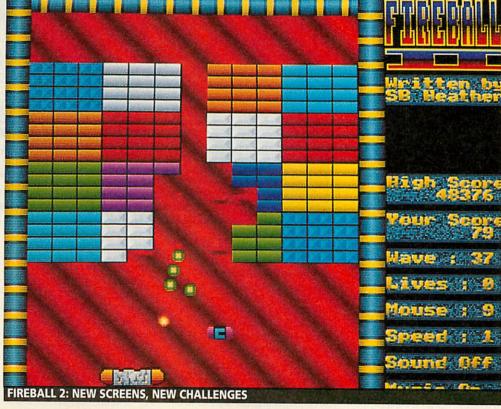
# GAIVIE SHOW

ollowing the success of Lemmings at the BAU Show, publisher Krisalis Software has committed itself to greater participation in the Acorn games world.

Its plan for the next year is to launch one game a month, the first two releases being conversions of Swiv (January) and Gods (February) from the Amiga. It will only have one release before Christmas namely, James Pond.

Swiv is best described as a vertically scrolling shoot-emup. Well, we've seen that before, but the Amiga version has picked up virtually every games industry award in the past year and was described by one magazine as 'undoubtedly the best shoot-em-up on the Amiga'. Gods has earned similar acclaim for its style of play in the ladders 'n' platforms environment. Set in Greek times, Tony Kavanagh of Krisalis describes it as more 'serious' than the satirical Chuck Rock.

Easter will see the release of a further 100 screens for existing Lemmings players. Loads of people have sent in the full set of passwords for the orig-



inal game (thank you), but we won't be printing them until the new screens are out next year. Meanwhile, you will just have to think a bit harder. It

may help to know, if you don't already, that a blocker can be turned back into a walker by digging away the earth beneath its feet. Thanks to W Glendinning of Crowthorne in Berkshire for that tip.

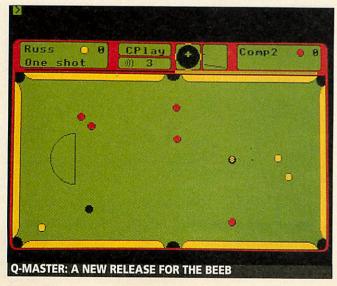
The Fourth Dimension's schedule is described in its 16page advertisement this month. Quite a few new games are shown alongside existing ones and (hopefully) most should be out before Christmas.

If you are looking for advice on which games to buy this Christmas, then undoubtedly the BAU Games Supplement in the November issue will have been helpful.

However, some games were not featured because they have only just been, or have yet to be, released. Cataclysm from The Fourth Dimension is one, in which you have to drain

your waterlogged spaceship (which has crashed into an ocean) by flying round with a jetpack and opening water-tight doors. I've played an early version of this and enjoyed it very much. Graphically it isn't stunning, but the motion of the water is fairly convincing and the puzzles have a definite Repton feel to them - Beeb hacks will know what I'm talking about.

As revealed in last month's news, Simis, the Guildfordbased software company, having written two flight simulators for Clares (Interdictor 1 & 2), and two more for Domark (MiG-29 1 & 2), has decided to release its development tools as a separate product. I saw the tools being used to design Interdictor 2 a year ago at the company's offices and suggested then that they would



make very welcome companions to the original games, especially as they function nicely within the desktop. I'm looking forward to creating my own custom-designed flight simulator. Apparently you can alter all the graphics, the scenario layout and the aircraft model as well as the cockpit design. Simis has promised that the flight simulator toolkit will be ready for Christmas.

For BBC owners, however, the selection is somewhat limited. Besides Play it Again Sam 16 (see review) the only new release is Q-Master from The Fourth Dimension, although Loopz from Audiogenic was launched in the summer and is still available.

Q-Master is a pool game with an action replay feature and a variety of game types, ranging from practice tables to friendly matches to tournaments. However, the view is two-dimensional, looking from overhead, and, although I've never played the game, it looks a bit old-fashioned from the screen shots.

A couple of years back Firebird released a pool game for the Beeb called 3D Pool which was spectacular, mainly due to the realism of the 3D. I'll reserve judgement on Q Master until I've played it.

The Fourth Dimension has also released two compendium packages of the golf game, Holed Out, and the car game, E-Type. At £24.95 each, they both contain the original games and all the extra courses/tracks that followed, as well as their respective course or track designers.

If your budget is small this year, take a look at Escape by Exeria (Risc OS machines), marketed by Soft Rock Software, 124 Marissal Road, Henbury, Bristol BS10 7NP. Available by mail order for only £3.49 including p&p. It's a simple game with quite blocky graphics, but it is worth playing and, at that price, it can't do any harm.

Finally, CIS has released a new set of screens for Fireball 2. These are more difficult but only just, so if you managed to complete the initial set, give CIS a call on 071-226 3340. And, on that note, have a very Gamey New Year.

Sam Greenhill



#### ENTER THE REALM

The Fourth Dimension Archimedes/A3000/A5000 Tel: (0742) 700661 £24.95

Enter The Realm could be described as the sequel to Nevryon - but instead of aliens it features knights. Written by the same author, Graeme Richardson, you play the noble knight Kharas, whose job is to seek out the great wizard and perform the obligatory quest.

Although the game manual hints differently (there is mention of gallivanting around on horseback), Kharas travels on foot, avoiding obstacles and killing nasties. Armed only with a set of knives and a strong right arm, he must progress through various lands in his search for truth.

At stages along the way buildings can be entered; some contain clues to help you on your way, others house a selection of do-gooders, keen to offer advice. By following their instructions, Kharas can work out what his quest really is and gets down to the important job of monster bashing.

The game takes place on a horizontally scrolling landscape, similar to your average arcade adventure. What makes it stand out are the six levels of

parallax, used to excellent effect to give a real sense of depth to the screen.

Parallax scrolling is basically the technique of moving different parts of the background (and foreground) at slower or faster speeds, depending on their depth in the overall scene.

If you imagine looking out of a train window, the hills in the distance seem to move much slower than the trees alongside the train track. This is the effect parallax utilises to give an illusion of depth. The graphics in the actual game are pretty good, if a little uncolourful. However, there is a price to pay for the fast (50 frames per second), multilayer parallax - mode 9 is used throughout, limiting graphics to 16 colours maximum at a time. The sound effects are of a high standard and the opening music sets the mood.

Like other adventure games, there is little to hold your attention once completed, but this is likely to take a while. If striding around in a tin can is your idea of fun, Enter the Realm is perfect.

**Rob Miller** 



#### CARTOON LINE

Eterna Tel: (0933) 279300 Archimedes/A3000/A5000 £19.95

'Dig! Dig!' I screamed in frustration as the buffalo stampeded towards the cowboy in the middle of the screen who is supposedly under my control. Too late! He was rocketed into the air and, well, what goes up must come down. Ouch!

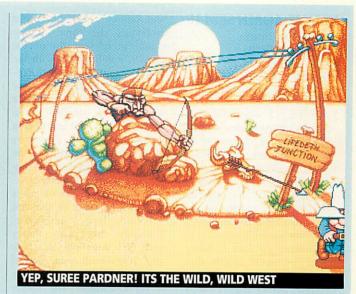
Cartoon Line is as much fun to watch as it is to play. The storyline basically goes like this: a little guy called LBJ is confronted in the Wild West by several attackers such as brutal buffalos, evil Indians, savage snakes and a whole handful more. You must kill, avoid or hurt the assassins.

When you've defeated all of them at least once in each trial, you meet the shamen who leads you to the next level.

There you'll meet more killers. The graphics and sound effects are excellent and our hero dies in sometimes funny and sometimes gross ways.

Although more like a cartoon than a game it does require a certain amount of skill to stay alive. I would like to have seen if the opponents on the higher levels were as amusing, but it is annoyingly hard to complete the first level. It is the sort of game that requires an awful lot of patience and after a while I felt like ramming the keyboard through the screen.

You can walk left or right, jump, duck and use the predefined action key to do whatever is necessary. When the Red Indian charges at him, pressing the action key makes LBJ draw his gun and shoot; when the scorpion crawls up to him the action key causes him to stamp on it. But you have to



be very accurate and you don't always know quite how you did it - making it very difficult to repeat!

At first I really enjoyed the game but after a while it became frustrating because, try as I might, I simply couldn't get to the next level. It is good fun with really fantastic graphics and sounds, but not recommended for people who get bored easily.

**Nell Greenhill** 

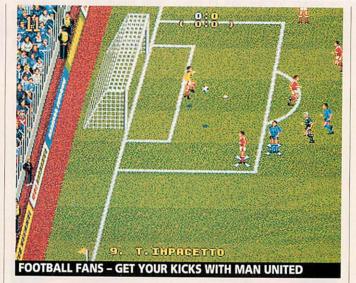
#### MANCHESTER UNITED EUROPE

Krisalis Software £25.99 Tel: (0709) 372290 Archimedes/A3000/A5000

Krisalis is emerging as a prolific developer of quality games software, and lucky Archimedes/A3000 owners are reaping the benefits.

Fresh from their success in the 1991 Cup Winners' Cup, that football team is back! This is a new football simulator based on the very popular Manchester United Football Club (see review in September 90), but with several improvements suggested by those who played the original. Apparently when the writers asked what people wanted in the new release, they were asked for a European version - and that's exactly what they've got.

This time, taking the role of Man United, you can take part in any football championship you care to mention. You name it, you can play it: the European Cup, European Cup Winners' Cup, UEFA Cup, European SuperCup or World Club Championship. All teams have their player details and club shield included. If you still have any energy left after that lot you can also play friendly matches with anyone



in UEFA, including Manchester United - which is either an amusing bug or a little known 5th division Albanian team.

As in the original, you can either concentrate on the management and running of acompetition, forgetting about the arcade section, or you can do both. However, the management side of the game is not as comprehensive; this version lacks the rather nice moving icons which kept appearing in the original.

Team members now have the correct numbers on their shirts, and the player currently

in possession of the ball is displayed along with other information on a large and impressive overscan screen. This is helpful, and adds to the atmosphere, but somehow the scrolling of the display and the movement of the players seems to be considerably slower than before.

Some of the nicest features of the first version have actually gone; there is no 'action replay' sequence after a goal, the little transparent map of everyone's location in the top of the screen has disappeared, and somebody has seen fit to put red in the shad-

ing of the grass on the pitch. Having said that, what is really important is the improved player control. After each kick of the ball there is a short moment in which you can apply after-touch to the shot, adding spin or chipping it over your opponent's heads. If the ball is in the air, depending on its height you can score some stunning goals with headers, volleys and sliding shots.

The penalty rules have been implemented in full this time, and you have the option to control the goalkeeper, or keep well clear and let the computer do the dirty work. Another bonus is the way two players can play on the same side essential for every computer football game - and there is ample support for joysticks if you prefer. Keyboard control is still via the cursor keys very uncomfortable for the seasoned Acorn gamer.

All in all, there are enough additions to justify buying the new version. Doubtless it will be a big hit with football fanatics, but I think Krisalis might have spent their time more productively, converting something completely new, rather than updating an old game. In any case, if you like football, this is for you. **Mathew Tizard** 

#### PLAY IT AGAIN SAM 16

Superior Software Tel: (0652) 658585 BBC 5.25in, £14.95; BBC/ Electron tape, £12.95; Master Compact 3.5in, £19.95.

Following 15 successful Sam compilation packages, Superior Software is continuing to bundle old and new games together, selling them for the price of one. Play it again Sam 16 contains two old Superior titles, Hostages and Perplexity, Pipemania from Empire and a new game called Vertigo.

Hostages involves a daring rescue of some dumb diplomats trapped in an embassy overrun with trigger-happy bad guys. As an SAS-style soldier you have to storm the place using snipers to terminate the terrorists. I actually prefer the BBC version to its Archimedes companion (see September 90). It's a fun game but not very flexible - the challenge exists only as long as it takes to complete each. level correctly.

Perplexity is best described as a cross between Pacmania and Repton. This is because it embodies the three dimensional maze scenario of the former, combining it with the more strategic element of Repton - a set of puzzles. Being of medium difficulty these are my sort of standard. The graphics glare a bit and motion is less than smooth. Perplexity is my least favourite of the four, maybe because I just prefer arcade action to strategy.

In Pipemania, the object is the same as that of the Arc version - pipe some flooze. Basically, this yucky floozy stuff is leaking out of a hole and, armed with a selection of pipe shapes, you have to pipe it off elsewhere. The longer you can keep the flooze on the flow, the more points you get.

Pipemania is a very addictive arcade game although I don't think it is quite as good as it was previously hyped up to be. However, it can be played by two people, and I'm a sucker for this sort of feature; it's much more fun.

The fourth and final game is the new one, Vertigo. It isn't a new concept as it borrows



heavily from a game called Gyroscope, released about six years ago, which in turn reflects the essence of my favourite arcade game of all time - Marble Madness. The idea is simple - you have to control a bouncy ball through a landscape of paths and valleys, your aim being to collect the diamond which can be found somewhere in each screen.

Sometimes the paths are quite narrow and dexterity is needed to guide the ball safely along; at other times you will need to gain enough momentum to carry the ball over a ridge or up a slope.

At one time Vertigo was going to be released as a separate title and remnants of this quality are plain to see, although I think it is probably happier in this compilation. Play it again Sam 16 is as good as any.

Sam Greenhill

#### CHEOUERED FLAG CIS

Tel: 071-226 3340 Archimedes/A3000/A5000 £25 (£15 for extra tracks to be released soon)

To date, car racing enthusiasts have seen the releases of Etype, Powerband and Saloon Cars. The question therefore is whether Chequered offers anything new...

For those who read such things, a nice manual is included which, besides outlining the game, explains how to run it on a 1Mb machine and install it on a hard drive.

On starting the game, the racer sees a screenful of options on a rather psychedelic chequered background. These include three levels of difficulty represented by different styles of helmet, from the boring, white and functional, to the exciting, red and dynamic.

You load drivers from disc and select one of four tracks (Monza, Silverstone, Mexico and Hungary) from a separate submenu. Another 15 tracks will be available for those who wish to race an entire world



series. There are two more menus, one to control the physical characteristics of the car, the other the mouse sensitivity and braking, via a mouse button, or pull-back on the mouse.

Automatic control of the seven gears can be used at most levels and a speedometer can be displayed to judge cornering speeds, although this can be removed if you prefer that 'real life' feeling. All these options are clearly laid out, and individual settings can be stored on disc.

So far, so good. You start the game, be it Practice, Qualification, or Actual race. Unfortunately the 'realistic landscape' referred to in the manual seems to be missing. Certainly all three dimensions are there, but the area surrounding the track is simply one shade of green, and signposts are scarce, although the cars are drawn quite well.

The Refresh rate is nice and fast, and those lucky enough to own an ARM3 will see it even faster, although the game itself plays at the same rate - a welcome feature. When played through speakers the engine noise whistled annoyingly.

Control of the car itself varies from reasonably taxing at beginner level, to very difficult. My car tended to spin off the track rather too often, and once off it seemed hard to get back into the race. The front wheels, while turning on screen, failed to get quite far enough round. The engine cut out and had to be restarted regularly, although this may be true to life. A big rev counter is displayed centre-screen.

While playing this game, I kept remembering that Saloon Cars retails at the same price, and although a different beast, is better for 'car game' freaks. But for those wanting a more accurate simulation of Formula One racing, Chequered Flag may suffice.

James Weeks

# Break 147 & Superpool





### Snooker & Pool Simulator Par Excellence









'BREAK 147' and 'SUPERPOOL' are game simulations in the true sense of the word. Gone are the power meters and fixed screw and side settings of inferior simulations and in comes a cue driven by reality software.

As in the real thing your grip on the butt of the cue (represented by the mouse), the smoothness and power of your cue action and the way in which you follow through with a shot, are all deciding factors in whether a pot is successful and whether you will retain position for the next ball. The only thing that is missing is the smokey air and a pint of beer on the edge of the table, these you will have to provide for yourself!

In both games you can choose to play on a practice table where anything goes. You can position balls wherever you wish so that you can improve your potting and positional play. You can even undo unsuccessful shots so that you can try them again. When you make that incredibly fine clip into a pocket or miss by the merest fraction, you can watch an action replay of the shot from any angle so that you can either gloat or see where you made that tiny mistake that let you down.

When you feel that you are up to the task you can play a single match against a friend or against one of the sixteen computer players. Should you feel lazy you can just sit and watch whilst two computer players battle it out between themselves. Alternatively you can enter a tournament where you will have to fight your way through the preliminary rounds and on to the coveted Final.

Whilst you are playing a match or in a tournament the game will be overseen by the referee. If in snooker you are 'on' a colour as in real life the referee will indicate the ball to you that he thinks you are going for and it is up to you to let him know if he is wrong. The referee will also call when a free ball is to be given, if there is a touching ball and your score after each successful

#### **SPECIFICATIONS**

256 colour MODE 13 graphics optimized for maximum speed 225k of machine code

Over 147k of high quality sampled speech and sound effects Ball plotting accuracy of +- 0.05 of an inch on a 12 foot table Cue butt controlled by the Mouse Bridge hand controlled by Keyboard

## BBC A3000 & ARCHIMEDES PRICE £24.95 Break 147 & Superpool" is compatible with the BBC A3000 and ALL Archimedes computers

#### Reviews

The graphics are so good that certain photos of the game being played could be mistaken for the real thing. The behaviour of the balls and cue are immaculately simulated." Acorn User, Nov '91.

"All aspects of the game are staggeringly realistic, from walking round the table and eyeing up the next shot, to the trajectories that the balls follow when they move....No longer is taking a shot an unconvincing experience comprising of aiming at the ball, selecting the power level, and hitting a key....The release of Break 147 & Superpool is a giant leap from anything ever seen on our screens, to what is arguably the most realistic snooker simulation ever to be found on a home computer." Club A3000, Autumn '91.





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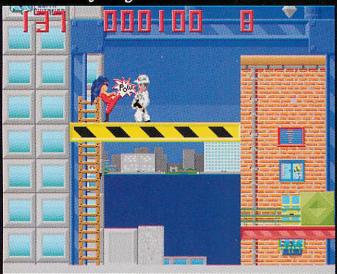
#### Reviews

"Both Break 147 and Superpool are accurate simulations of the sport. The control method works well and the result is two very enjoyable games in one pack... whether you are a snooker & pool fan or not Break 147 & Superpool are highly recommended." Archimedes World, Nov '91.

"The most realistic snooker sim I've ever seen." The Micro User, Nov '91.

"If you're a snooker or pool fan who wants a quality simulation for the computer then this is it .... In all, an excellent implementation of the game and I'm sure that due to the realistic 3D movement around the table, practice at Break 147 & Superpool may even improve your real game." Micronet, Sept '91.

# The Exotic Adventures of Sylvia Lain



# "A Young Woman with 9 Lives and a License to Kill"

The Exotic Adventures of Sylvia Lain features 256 colour mode 13 graphics and supersmooth scrolling using six planes of overlapped parallax with a frame rate of 50 Hertz. The player controls a highly dextrous young woman who can jump, somersault, roll, kick, punch and more.

Over 50 frames of animation in each direction are used on Sylvia alone.

#### Game Outline

Your mission will take you from the latest construction sights of New York to the ancient temples of the Aztecs in South America. After some magic moments you will be whisked on to the Kennedy Space Centre and finally to the B.E.N. Headquarters hidden in a giant oil refinery somewhere in the Middle East. The gameplay is a carefully blended mixture of puzzle solving, arcade adventure, beat'em up and humour.

#### Mission Brief

The Nobel prize winner, Prof. Doughnut, was abducted yesterday only minutes before he was due to give his historic speech explaining his solution to the world's energy problems. It is believed that the professor has achieved room temperature fusion using the highly unstable elements found only in camel dung. However the exact formula has disappeared with the Prof. We believe that his abductors were none other than B.E.N..

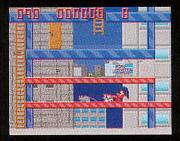
Sources have reported that during the struggle, pages from the scientist's notes were left behind. Your mission is to recover all the scattered pages of the Professor's Notes. Not only will these pages provide clues to the missing formula but the cunning academic has managed to scribble maps on each of the pages giving clues to his next location.

The professor was taken from outside the science faculty in New York. You will therefore be transported there immediately by an Ecologically friendly blimp. You will start your mission by recovering the lost pages at this location. Unfortunately our agents report that B.E.N. already have operatives working there. You are therefore licensed to kill and should use any means necessary, short of damaging the environment, to retrieve the missing papers and hopefully rescue the professor.

# BBC A3000 & ARCHIMEDES PRICE £24.95 Release date hopefully mid Nov '91









# Drop Ship



### "Supersmooth Superfast Pure Arcade Action"

Drop Ship is one of the smoothest and fastest arcade games you are likely to see. It features superb 256 colour graphics, 15 increasingly large and diverse stages and an excellent stereo soundtrack.

The Year is 2020....The government proudly announces that the new fast breeder farm on the Mars colony is completely computer managed and totally safe, defended from attack at all times by a fully-automated tactical defence system.

The Year is 2030....Earth receives a transmission from the Mars colony. The radiation seems to have affected the management software at the fast breeder farm. The defence systems have gone haywire and the whole farm is rapidly approaching meltdown. If all the reactors are not shut down the Mars colony will be wiped out.

The defences include gun emplacements, artificial gravity generators, sporers and hoards of deadly aliens. What is needed is a craft which is supremely manoeuvrable, capable of great speed and possessing awesome fire power, and a pilot of extraordinary bravery to fly it. The craft is the Drop Ship. The pilot is you.

#### Specifications

256 colour mode 13 graphics. Frame Rate: 50 frames per second. Maximum objects on screen: 150 per frame

The ship movement in the game is accurate down to 0.0001 of a pixel.

"A brilliantly addictive game which really makes you want to barricade yourself into a room for a week in order to finish it....The graphics and animation are really superb." BBC Acorn User, Jan '91.

"Compared to both Rotor and Caverns, this game has to be tops. The gameplay is even more difficult than both and the graphics and sound far better." Risc User, Dec' 90.

"Drop Ship is very arcade-like, with excellent graphics, the smoothest movements in town, nice sound effects and a good short demo." Archive, Jan '91.

"To sum up, a game that'll keep you hooked on your machine for many a late night with a cup of Hot Chock." Club A3000, Summer '91.

#### BBC A3000 & ARCHIMEDES PRICE £19.95

Drop Ship is compatible with ALL Archimedes computers









SPECIAL OFFER: If you buy The Real McCoys 1 & 2 directly from us you may deduct £10 from the total cost

# The Real McCoy

# The Real McCoy 2



### "This 4 Game Collection really is The Real McCoy"

#### U.I.M. (R.R.P. £29.95)

U.I.M. (Ultra Intelligent Machine) is a futuristic action adventure set in the oceans. It is a huge game featuring solid 3 Dimensional graphics and digitised sound effects. You must travel the oceans in your highly expandable submarine visiting the enumerous ports throughout the ocean networks. As well as gaining combat skills you'll need to learn to trade in commodities, shares and currencies. There are over 250 missions to complete before you will find your goal the U.I.M. - created to be almost a god.

"U.I.M. is a powerful game that justifies its higher price tag through guaranteed longer life." The Micro User

#### ARCADE SOCCER (R.R.P. £19.95)

Arcade Soccer really is World Cup Football action at its very best. Using an overhead view to make gameplay as exciting as possible it features everything that you could want in a football game. Corners, throw-ins, goal kicks, dribbling, shooting, passing and much more. The superb graphics and smoothly scrolling pitch are complemented by a multitude of excellent digitised sound effects and music. Furthermore Arcade Soccer is packed with options catering for up to 24 players, weather conditions, friendlies, accurate full World Cup simulation and replays to mention but a few.

"This game is excellent .... I'm not really a soccer buff, but I thoroughly enjoyed this desktop version. The micro-controlled players behave in an amazingly realistic manner." The Micro User WHITE MAGIC (R.R.P. £19.95)

White Magic is a unique arcade adventure in which you control 4 varied adventurers: a Leprechaun, a Titan, a Warrior and an Enchanter. You can transform between all 4 characters at will and use their much needed special abilities. It features 32 massive action-packed levels filled with aggressive guards and trolls, haunting ghosts and spectres, curious objects to use and find, and much more. White Magic is not a game for the faint-hearted; it is a fast action game which requires fierce hand-to-hand combat and frantic weapon fire. Playability is good and I had to tear myself away in order to write this update review," The Micro User

QUAZER (R.R.P. £11.95)

Quazer is a fast action arcade style game with excellent music, sound effects and graphics. It has 11 incredibly detailed and varied vertically scrolling levels filled with the most amazing assortment of baddies you are ever likely to see. Quazer is classic arcade action and will test even the most competent games player to the limit.

"The power of the Archimedes is used to produce some stunning effects..." The Micro User

#### BBC A3000 & ARCHIMEDES PRICE £29.95

The Real McCoy is compatible with ALL Archimedes computers











### "This 4 Game Collection really is The Real McCoy too!"

#### APOCALYPSE (R.R.P. £29.95)

Apocalypse places you on the surfaces of 9 varied futuristic hostile planets colonised by very varied but always ruthless enemies. In your highly advanced and extremely fast and manoeuvrable craft you must find your way around the increasingly massive planets and systematically annihilate the enemy

Simply, this is the best release yet for the Arc by absolutely miles. Stunning graphics, stunning sound and masses of action. Brilliant."....Risc User

#### HOLED OUT (R.R.P. £19.95)

Whether you're young or old, male or female, beginner or professional Holed Out has been designed especially for you. Features include: 2 contrasting courses, 1 to 6 players, excellent 3D graphics and sound effects, full set of accurately defined clubs, slice/hook capabilities etc.

"...I play golf and this is the nearest thing I've seen to the real game on a computer. The graphics are very good with a large scale golfer complete with bag and trolley (and a good swing!) and the sounds are very realistic."....Archive

it is quite a stunning piece of work."....The Micro User

#### THE OLYMPICS (R.R.P. £19.95)

The Olympics can be played by 1 to 8 players and is comprised of 6 main events: Diving, Shooting, Javelin, Swimming, Canoeing and Pole Vault. It contains a superb piece of music, opening and closing ceremonies and 14 national anthems.

"Compilation packages of sporting events may have been round on other machines for ages but the first one for the Arc is every bit as good .... VERDICT: A Gold Medallist."....A&B Computing (Now Archimedes World)

"Excellent graphics .... Classy presentation .... and plenty of variety .... Should find favour with all members of the family. Definitely recommended.".... Risc User

#### INERTIA (R.R.P. £19.95)

Inertia is a totally original game with beautiful graphics and superb digitised sound effects and music. There are 2 massive and varied landscapes to be explored and many special tiles to be collected. Your craft floats freely around the landscapes and you must exert forces upon it to guide its speed and direction. Full colour 3 dimensional maps of the 2 landscapes can be viewed at any time and are a joy just to wander around.

the accompanying music is superb .... Inertia is another reasonably priced game for all ages. Highly recommended,"....The Micro User

#### BBC A3000 & ARCHIMEDES PRICE £29.95

The Real McCoy 2 is compatible with ALL Archimedes computers









# Spitfire Fury



### "A Superfast, Action-Packed, Fun & Accurate Simulation"

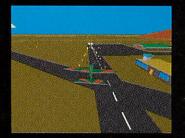
Spitfire Fury is the latest flight simulation game created by Andrew Hutchings (the author of both the Chocks Away games). In this action-filled game you take the controls of the most famous World War II fighter plane and have to tackle a range of challenging missions and tasks. The game has been designed to be an action-packed, superfast and accurate simulation with lots of fun to appeal both to the beginner and the expert.

- •Superfast screen update, 12 to 18 frames per second.
- Two player option using split screen or two computer serial link.
- •Computer-controlled planes fighting alongside you against the common enemy.
- •Lots of varied and action-filled missions with over 100 enemy targets to destroy in certain cases. Such as Escorting Bombers, Bombing Raids, Torpedo Attacks on Gun Boats, Solo and Accompanied Missions, etc.. Plus of course a range of practice missions to help you get the hang of landings etc..
- •Save and load game options are provided allowing you to save the game onto disk at any point and return to it later.
- •A Super Accurate model of the plane has been created taking into account wind speed, airspeed over all control surfaces, gravity, drag and lift of each control surface etc.. This makes the plane capable of performing realistic stunts such as spins, which has not yet been seen on ANY previous Archimedes flight simulations.
- •Full interaction between all planes, bullets, hills, valleys, buildings etc. This means you can seek cover by flying close to hills, buildings etc. and the enemy planes (and your fellow Spitfires) can make mistakes and shoot each other or crash into obstacles.
- 256 colour graphics, digitised sound effects and complex scenery over huge expanses of land including cities, rivers, roads, hills, valleys, railways, boats, etc.
- A huge selection of viewpoints and tracking cameras are provided for you to view the action from. Plus entire flights can be recorded and watched later from any angle.

Please note that the screen shots shown are of a very early development version and therefore do not illustrate the graphics which will be included in the final version. Look out for the adverts around the release date for screen shots of the final version.

# BBC A3000 & ARCHIMEDES PRICE t.b.a. Release date hopefully February '92









# X-Fire



### "Highly Addictive Classic Arcade Action"

X-Fire is an exciting new arcade game which represents a welcome return to traditional arcade values.

Pit your wits and reflexes against hordes of menacing aliens within a high tec battle arena. At your disposal is an awesome array of fire power that is all that stands between you and certain destruction. Both cunning and dexterity will be required to prevail against increasingly sophisticated and dangerous opponents.

Collect bonuses to aid you in your task and augment your ship's capabilities. Regen Bombs, Split Bombs, Shield Reserves and Zaps are just a few of the bonuses available.

With crisp graphics and addictive arcade action, X-Fire combines the best qualities of classic arcade games with the advanced audio and visual capabilities of the Archimedes to create the ultimate high speed shoot'em up.

#### Specifications

256 colour MODE 13 graphics Highly optimised custom graphic routines Up to 200 objects on screen Over 300k of high quality sampled sound

X-Fire is an essential purchase for any serious game player in search of a lasting challenge.

#### BBC A3000 & ARCHIMEDES PRICE £24.95 Release date hopefully mid Nov '91









# andora's





# "State of The Art Arcade Adventure"

An intriguing blend of classic puzzles and full-blooded arcade action. Over 200 screens of stunning artwork and game play of the highest quality will appeal to the dedicated adventurer or arcade fanatic.

#### Prologue

Since ancient times a fastened box has symbolised the danger of our curiosity. This box has been opened and an entire kingdom has been poisoned by the evils unleashed.

The beast that lurked within is free and seeks the souls of men, possessing them and devouring them at will. Feeding upon misery, it profits by treachery and corruption, and in doing so brings the burden of its evils upon the land.

As the finest sorceror in the kingdom you must overcome the black magic and confine the curse once again to the only dungeon strong enough to contain such furious depravity - Pandora's Box.

#### Quest

The powerful Panmetric graphics system allows you explore complex rooms and stunning landscapes whilst still having plenty in reserve to handle frenzied battles.

At first only armed with a keen wit you must acquire knowledge and magical weapons as the adventure gives way to arcade action. Exploring the length and breadth of the land you could conquer a world of magic or die in obscurity.

#### Technical Information

Frame Rate **Object Code** 

150k of Handwritten Arm Code Graphics

Over 1000 sprites totalling 3Mb of graphics

256 colour, mode 13 graphics Panmetric graphics system Digitally sampled sound effects

Sound Computer

Any Archimedes with 1Mb or more

### BBC A3000 & Archimedes Price: £24.95





bound by a coloured ribbon. transferred to

this book.







| Roll of Honour |         |       |        |  |  |
|----------------|---------|-------|--------|--|--|
| Liank          | Dame -  | Score | Done " |  |  |
| Mayor          | Merlin  | 2500  | 25%    |  |  |
| Deoman         | Pandora | 1500  | 15%    |  |  |
| Beggar         | Robert  | 1000  | 10%    |  |  |
| • Tramp        | Zippy   | 500   | 5%     |  |  |
| Leper          | Gordon  | 0     | 0%     |  |  |
| Awarde         | d by    |       |        |  |  |
|                | archui  | Rex   |        |  |  |
|                |         |       |        |  |  |



# "Anybody can be an Artist with ARCtist"

This superb painting program has been designed to be incredibly easy to use and yet totally jam packed with features. Developed with help from educational specialists and professional graphic artists, ARCtist is ideally suited to home, school and professional users.

Just a few of ARCtist's features include:

- Full screen 256 colour mode 15 editing. RISC OS compatible.
- Intelligent spray gun that 'shades' rather than just plotting random dots of colour.
- Rotation up to 2870% faster than !Paint.
- Internal handling of up to 30 sprites with auto sprite naming, sorting, grabbing, cutting, instant masking, rotation, scaling etc..
- Masking tape option lets you mask any part of the screen for spray gun work, then lift off later to reveal what was underneath.
- Zoom around the screen at high speed and edit with pixel accuracy.
- Several brush types available with variable size.
- Undo option undoes the last change you made to a drawing, in case of mistakes.
- Special effects to distort, detect edges, trace with colours, trace with sprites, swap colours, dither colours, blur, anti alias etc. etc..
- Special proportionally spaced outline fonts that don't require any memory in the font cache. Put a rectangle around the area you want the text to fit and ARCtist will scale it to fit.
- Rectangle copy, move, rotate and scale. Also, accurate shape cut copy, move, rotate and scale tools to slice out the exact part of the screen you want.
- Sprite animation with built insequence editor, offset generator & flight path editor.
- Load, edit and save fill pattern files. ARCtist fill patterns are twice the size of normal ones.
   The serve definable describes broken can be defined directly as arabbed from
- Two user definable drawing brushes, can be defined directly or grabbed from anywhere on the screen.
- · Several hundred Kbytes of clip art included.

#### BBC A3000 & ARCHIMEDES PRICE £24.95

ARCtist is compatible with ALL Archimedes computers









# Nevryon



### "A Superlative Action-Packed Arcade Game"

During The First Great Space War of 2100 reserves of titanium, the chief metallic element involved in ship construction, begins to run out throughout the known universe. Only the human-colonised planet - Nevryon - has large reserves. You must destroy all alien forces which are attempting to take over Nevryon.

To succeed you must complete 4 very different missions: destroy the alien bases on the Surface and in the Caves of Nevryon, plus destroy from within both the Alien Battlecruiser and the huge Alien Beast. The aliens will attempt to attack and confuse you with every type of vessel they possess.

You begin each mission with a standard short range V5 Fighter. Anything larger would undoubtedly mean detection and death before you could even begin. However, once in the thick of the action, your fighter is able to collect and use a large array of extra weaponry and shielding. You will be on your own but you will not be forgotten....

#### Specifications

Over 1.5 Megs of 256 Colour Mode 13 Graphics. Over 60 Objects On Screen at Once 25 Frames/Second Scrolling and Animation. 6 Levels of True Parallax Scrolling Big Sprites. 4 Channel Sound Played at 20kHz

6 Pieces of Superb Stereo Music. Multi-Channel 'Live' Stereo Sound

"Fans of strategy games won't like this one, but for the masses who enjoy total alien genocide, dushdi graphics and equally appealing sound, this game must surely be worth a mention on your list to Santa. I wholeheartedly recommend this game as the definite shoot'em up for the Arc..." Club A3000, Summer '91.

"Nevryon features the best graphics and sound I have ever come across. All of the superb sprites are packed with amazing detail and the animation and scrolling are completely flicker-free." Micro User, Nov '90.

"The 4th Dimension have come up trumps with another classic...Graphics are superb...The number of animated objects, missiles, scenery and details will put many ST and Amiga to shame with the sheer power of the ARM chip." Micronet, Aug '90.

#### BBC A3000 & ARCHIMEDES PRICE £19.95

Nevryon is compatible with ALL Archimedes computers



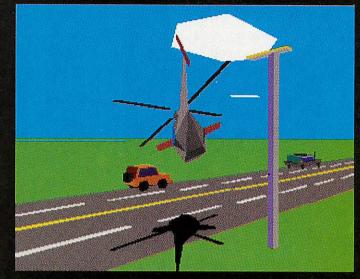






# Chopper Force





# "Superfast Action-Packed Chopper Sim"

#### Gameplay

The year is 2023 and advanced weapons' systems such as laser-guided munitions and stealth technology has fallen into the hands of a terrorist organisation.

You pilot a highly advanced helicopter on a number of varied and increasingly challenging missions to attack the terrorists, 'accompanied' by NEXT GENERATION uncannily realistic 3D graphics.

Hardened flight simulator addicts who may no longer find it challenging to pilot a plane will just love learning how to master the controls of the advanced and highly manoeuvrable military helicopter in Chopper Force. And in 2023 there are new super high technology 'smart' weapons to be mastered!

In Chopper Force there are missions that you could never dream of attempting in a plane simulator - such as picking up military hardware with a rope and transporting it to where it is needed as quickly as possible or conveying important intelligence information from the top of a skyscraper in one city to where it is vitally needed in a neighbouring city.

Experience a feeling of total power by hovering a safe distance from a convoy supplying the terrorists and picking them off from a safe distance with your smart missiles. Knock out communication lines going into and out of their HQ to totally cut them off. You will come across their own advanced helicopters, jets, tanks, laser-guided missiles, the dreaded flak, etc..

The final highly tasking mission involves attacking the enemy HQ to totally annihilate the terrorists.

If you can get this far then you are truly worthy of the Chopper Force.

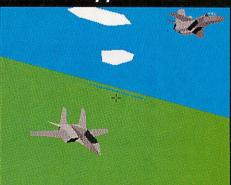
#### Specifications

Graphics: 256 colour mode 13 graphics Frame Rate: Up to 25 frames per second Polygons per frame: Up to 500 Polygons per object: Up to 80

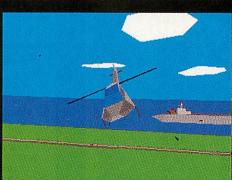
BBC A3000 & ARCHIMEDES PRICE t.b.a. Release date hopefully March '92 The screenshots shown were taken from a young version of Chopper Force













# The Fourth Dimension

SPECIAL OFFER: If you buy 3 or more products directly from us you may deduct £10 from the total cost





Pandora's Box



**Enter The Realm** 



Saloon Cars



The Exotic Adventures of Sylvia Lain



Break 147 & Superpool



**Grievous Bodily 'ARM** 

t.b.a.



**Chocks Away Extra Missions** 

### ACORN BBC A3000 & ARCHIMEDES SOFTWARE

The following software is compatible with the BBC A3000 and ALL Archimedes computers

#### ARCADE GAMES

| ARCADE GAMES                                  |       |
|-----------------------------------------------|-------|
| Grievous Bodily 'ARM (Hopefully late Nov. 91) | 24.95 |
| Cataclysm (Hopefully late November '91)       | 24.95 |
| X-Fire (Hopefully mid November '91)           | 24.95 |
| Boogie Buggy (Arcade Graphics & Gameplay)     | 24.95 |
| Nevryon (Unbelievable Graphics & Gameplay)    | 19.95 |
| Inertia (Isometric Arcade Action)             | 19.95 |
| Apocalypse (3D Mega Game - 9 Planets)         | 29.95 |
| Drop Ship (Superfast Arcade Action)           | 19.95 |
| Arcade Soccer (World Cup 1-24 Players)        | 19.95 |
| The Olympics (6 Varied Events - 1-6 Players   | 19.95 |
| Quazer (Furious Arcade Action)                | 11.95 |
|                                               |       |

### EDUCATIONAL SOFTWARE (from Triple 'R' Education)

| Picture Book  | 19.95 |
|---------------|-------|
| Money Matters | 19.95 |
| Data Word     | 19.95 |
| Target Maths  | 19.95 |
| Converta-Key  | 19.95 |

#### 3D SIMULATIONS/GAMES

Chopper Force (Hopefully March '92) Spitfire Fury (Hopefully February '92)

| Saloon Cars (The Ultimate Driving"Game-ulation"!  | 24.95  |
|---------------------------------------------------|--------|
| Break 147 & Superpool                             | 24.95  |
| (Incredibly Realistic Snooker and Pool Simulator) |        |
| Chocks Away (Biplane Sim. for 1 or 2 Players)     | 24.95  |
| Chocks Away Extra Missions                        | 19.95  |
| (26 Extra Missions plus some Superb Enhancer      | nents) |
| Chocks Away Compendium                            | 39.95  |
| (Chocks Away + Chocks Away Extra Missions)        |        |
| Powerband (Superfast Formula 1 Grand Prix)        | 24.95  |
| E-Type Compendium (3D Classic Car Racing          | 24.95  |

# (E-Type + Extra 100 Miles + Designer) **Holed Out Compendium** (3D Golf 1-6 players) 24.95 (Holed Out + Extra Courses Vol.s 1 & 2 + Designer)

#### GRAPHIC ADVENTURE

The Wimp Game (Unique Graphic Adventure) 19.95

#### ARCADE ADVENTURES

| The Exotic Adventures of Sylvia Lain      | 24.95   |
|-------------------------------------------|---------|
| (Release date hopefully mid November '91) |         |
|                                           | ~ . ~ - |

Pandora's Box (Stunning Graphics & Gameplay) 24.95 Enter The Realm (Supersmooth Arcade Action) 24.95 Pysanki (Futuristic Arcade Adventure) 19.95 Man-At-Arms (Medieval Arcade Adventure) 19.95

U.I.M. (Massive 3D Action Adventure) 29.95 White Magic (Magical Arcade Adventure) 19.95 White Magic 2 + Designer 19.95

#### **COMPILATIONS**

The Real McCoy (4 Game Compilation) 29.95 (U.I.M., Arcade Soccer, White Magic & Quazer)

The Real McCoy 2 (4 Game Compilation) 29.95 (Apocalypse, Holed Out, The Olympics & Inertia)

#### SPEECH & ART SOFTWARE

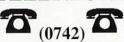
ARCtist (Easy to use Professional Art Package) 24.95 ARCticulate (The Animated Speech Synthesizer) 24.95

# BBC MICRO, MASTER, COMPACT & ACORN ELECTRON

| Title                                       | BBC B &<br>Electron<br>Cassette | BBC B &<br>Master<br>51/4" Disc | Master<br>Compac<br>3½" Disc |
|---------------------------------------------|---------------------------------|---------------------------------|------------------------------|
| Q-Master (Realistic Pool Game)              |                                 | 14.95                           | 15.95                        |
| Picture Book (Educational Software)         | 12.95                           | 14.95                           | 15.95                        |
| Money Matters (Educational Software)        | 12.95                           | 14.95                           | 15.95                        |
| Data Word (Educational Software)            | 12.95                           | 14.95                           | 15.95                        |
| Target Maths (Educational Software)         | 12.95                           | 14.95                           | 15.95                        |
| Converta-Key (Educational Software)         | 12.95                           | 14.95                           | 15.95                        |
| E-Type (3D Classic Car Racing)              | 9.95                            | 14.95                           | 15.95                        |
| Nevryon (Pure Arcade Action)                |                                 | 14.95                           | 15.95                        |
| Inertia (Isometric Arcade Action)           | 9.95                            | 12.95                           | 13.95                        |
| U.I.M. (Massive 3D Action Adventure)        |                                 | 19.95                           | 21.95                        |
| Holed Out (3D Golf for 1 to 4 Players)      | 12.95                           | 14.95                           | 15.95                        |
| Holed Out Extra Courses Vol.1               | 9.95                            | 11.95                           | 12.95                        |
| Holed Out Extra Courses Vol.2               | 9.95                            | 11.95                           | 12.95                        |
| Arcade Soccer (Fast Action - 1 or 2 Players | 9.95                            | 12.95                           | 13.95                        |
| White Magic (Magical Arcade Adventur        | e) 9.95                         | 12.95                           | 13.95                        |
| White Magic 2 + Designer                    | 9.95                            | 12.95                           | 13.95                        |
| The Art Studio (Easy to Use Art Packag      | ge) 9.95                        | 12.95                           |                              |

### **HOW TO ORDER**

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The Fourth Dimension, 1 Percy Street, Sheffield, S3 8AU, England.

#### NO Quibble GUARANTEE

If any of our discs ever become faulty (for whatever reason) we will replace them free of charge immediately. Simply return them to us with your name and address.

# THE FOURTH DIMENSION Software Catalogue



THE Archimedes Games Specialists



# Grievous Bodily 'ARM





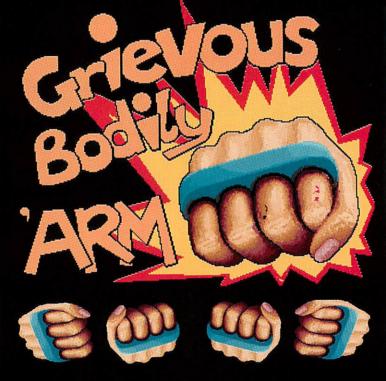
# "A Brutal Uninhibited Arcade Beat'em Up!"

#### The Plot

An evil scientist discovers a cheap and easy way to manufacture vast quantities of illegal narcotics. His intentions to turn cities full of people into junkies, all dependent on his supplies.

Mass addiction spreads throughout the city within days - like a deadly plague. Gang violence, looting, mugging - people will do anything to get their next fix, your only chance for survival is to get the crazy scientist yourself and make sure he will never be able to make any drugs again.

Punching, kicking - finding weapons along the way, you fight through hordes of junkies in streets, warehouses and sewers until you reach the mad scientist's laboratory where you must 'deal with him for good'.



#### The Development Team

Comprises a Software Engineer and Graphic Artist who previously worked for years in the American arcade and home console markets, writing ultraplayable games that have sold around 1 million copies worldwide. Now writing for the technically superior Acorn RISC based range of computers.

#### Techno Stuff

Frame Rate 50 Frames/Second Constant

Object Code Handwritten Arm Code and Basic

Graphics Over 1.5 Mbyte. High Speed Custom Written Graphics Handlers

Sound Digitally Sampled

Computer Archimedes with 1 Mbyte or more

Inputs Keyboard or Joystick

#### BBC A3000 & ARCHIMEDES PRICE £24.95 Release date hopefully late November '91





# Saloon Cars





# The Ultimate Driving "Game-ulation"!



Combining the best features of a fast and furious racing game with the realism of an accurate driving simulator. Work your way up through the leagues, buy extra features and faster cars, to become the Saloon Car Racing Driver of the Year.

#### Game Plot

You are an amateur racing driver just starting in the field. You race at weekends during the summer, and have a full time job at the office all week\* which helps to pay some of the gargantuan bills you incur at weekends! You have recently blown your life savings on an Astra GTE and entered a season of races..

With your Astra you compete in class C against the other Astras and, if you prove yourself worthy by working your way up through the league, you may eventually manage to get sponsorship to race in class B. At this point you will need to buy a BMW M3, built to your exact specifications and the manufacturer's custom price. After a few more seasons you may even reach the exalted heights of a Cosworth Sierra..

\*It is beyond the scope of this program to provide a realistic simulation of a full time office job!



The mathematical simulation of the dynamics of a car in motion was set up by a professional physicist. A Classical Newtonian model is used for the transmission and to model the motion of the wheels on the road in both regimes of sliding. The result of all this is a program realistic enough to allow front, rear and four wheel slides, Understeer and Oversteer and of course handbrake turns.

#### Graphics

The game features 256 colour, mode 13 graphics, designed by a professional artist. The view is a first person, cockpit view from which you can see the road ahead, the rear view mirror and the instruments. The main view features totally customised handwritten ARM code graphics routines which were necessary to maintain the superb frame rate and create a view previously undreamed of. The courses (Silverstone & Brands Hatch) feature bridges, stands, gravel traps, barriers, the pit lane, and even the man with the chequered flag. Of course there are many other features, but we think it's better to save most of them to be a surprise!

#### Technical Information

Frame Rate Object Code Up to 25 FPS

Graphics

250k of Handwritten Arm Code 256 colour, mode 13 graphics

Sound

Handwritten, custom graphics routines Digitally sampled sound effects (Naturally!)

Computer Inputs

Any Archimedes with 1Mbyte or more

Mouse, Keyboard or Joystick Serial Link

This option will be supplied on a separate disc

#### BBC A3000 & ARCHIMEDES PRICE £24.95 Saloon Cars" is compatible with the BBC A3000 and ALL Archimedes computers BBC A3000 &

#### Reviews

The graphics are very impressive - 256 colours with the screen updated at a very fast rate. ....technically Saloon Cars is a breathtaking piece of programming and a stunningly accurate simulation." The Micro User, Sep '91.

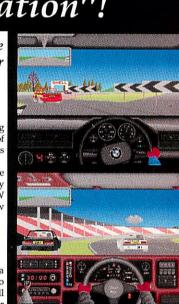
"...Saloon Cars uses real-time 3D graphics to produce a game that the Amiga can't hope to match (and so far as PCs are concerned you'd probably need either a 33MHz 386 or even a 486!)....The game features 256 colours (mode 13) and absolutely stunning animation. Make no mistake: the speed and smoothness of this game has to be seen to believed. It's the first simulation I've seen on a computer (i.e. outside of mega-expensive arcade machines loaded with custom chips) that actually feels like you are in a car!" Syracuse, Summer '91.

#### Reviews

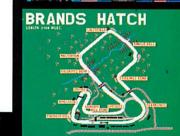
"Once you actually start racing for the first time your jaw will need chiselling off the floor - you cannot help but be astounded at the gameplay.....The cars and courses are realistic down to the millimetre (well, nearly!).....To be honest, I would not have imagined that with the amount that goes on, the display would have scrolled so smoothly. You simply need to see it to believe it!" Club A3000, Summer '91.

"For all you driving and/or racing enthusiasts this is the one you've been waiting for. It's also fine for anyone who just wants a good game." Acorn User, Oct '91.

"...if you are looking for a realistic simulation coupled with a fun arcade game and can't afford the running costs (or repairs) of a Cosworth, then Saloon Cars is a must." Micronet, July '91.







# **ARCticulate**



### "The Animated Speech Synthesizer"

This unique and revolutionary speech synthesizer actually has faces that talk to you and to each other. You can choose from 4 main faces and voices - male, female, alien or droid - thereby truly bringing your computer to life!

ARCticulate works in the desktop environment allowing full multi-tasking with word processors etc.. ARCticulate will read any documents that you have written or you can insert jokes, questions etc. etc..

insert jokes, questions etc. etc..

You can alter the pitch, speed, volume and of course voice, during and after any sentence, thus allowing the faces to even talk to each other. The Dictionary supplied is a RISCOS application and is simplicity itself to use. It holds up to 600 words in any file and you can have as many files as you wish - ideal for specialist subjects.

Also included in the package are a selection of jokes, some amusing noises to attach to desktop events, a provisional dictionary file and a superb demonstration program showing you just how articulate Arcticulate is!

#### **FACTFILE**

- 4 animated faces able to cover all mouth positions
  4 meticulously sampled voices which can say absolutely anything you want
- · All faces and voices can be installed together
- An individual face and voice can be installed in less than 120K
- Very easy to use dictionary application with up to 600 words per file and
- Reads text files, word processor documents and can be easily used with your own programs
- Entertaining Joke program, Demo program and Funny Noises program also included

"...ARCticulate produces clearer and more natural speech than any of its rivals. It also has talking heads." Archive, Sep '91.
"...the actual quality of the speech is excellent - I have never heard

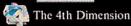
computerised speech sound so real.... The male and female voices actually sound like real people....ARCticulate is a fun program, and demonstrates high quality speech on the Archimedes." Syracuse, Summer '91.

#### BBC A3000 & ARCHIMEDES PRICE £24.95

ARCticulate is compatible with ALL Archimedes computers

#### ARCticulate



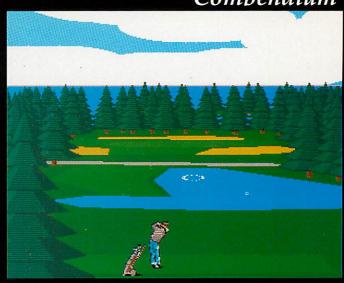








# Holed Out



### "An Immensely Playable Golf Game for 1-6 Players"

#### The Original Holed Out

This superbly enhanced version really shows the power of the Archimedes at its best. The game is completely mouse driven and features atmospheric digitised sound effects to convince you that you are really playing golf.

- 1 to 6 players. 2 contrasting 18 hole courses.
- · 4 skill levels for beginner to professional. Learn to play without worrying about the wind, bunkers or rough.
- Realistic ball flight paths. Slice and hook capabilities.
- · Variable wind on each hole every round is unique.
- · Full set of 14 clubs with accurately defined performances. You must consider your lie, the distance required, the wind conditions, the height required and the degree to which the ball will bounce and run along the ground.
- Bunkers, trees, water and variable rough.
  Constantly updated full scoreboard.
  Matchplay or strokeplay options.

"I play golf and this game is the closest thing to the real game on a computer. The graphics are very good with a large scale golfer complete with bag and trolley (and a good swing!) and the sounds are very realistic." ARCHIVE, June'89.

"....a great game." The Micro User, August, '89.

#### & The Holed Extra Courses 1 & 2

These feature 4 extra 18 hole courses which have been meticulously created to test your golfing skills to the limit.

#### & The Holed Out Designer

Create your own courses with this easy to use yet highly sophisticated hole designer. Its flexibility allows you to define all aspects of the holes from their pars to the size, shape and position of the holes.

"The Holed Out Designer is very easy to use and it makes a perfect complement to the original game," The Micro User, Jan'90.

#### BBC A3000 & ARCHIMEDES PRICE £24.95

The Holed Out Compendium is compatible with ALL Archimedes computers

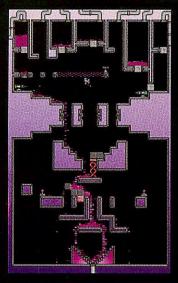




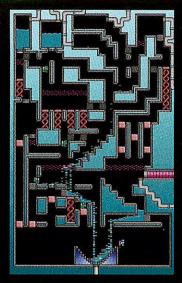




# Catalysm







# "A Stunningly Original and Watery Game!"

#### Scenario

Unable to escape the gravitational pull of a truly massive planet, the cosmic exploration ship hurtles ever nearer to the planet's surface. The moment of impact fails to happen. Horrendous creaking sounds, and the faintly audible sound of running water provide sufficient evidence to enable the ship's supervisor to eventually grasp the situation. Submerged beneath a vast and alien ocean, the *Orcna* is gradually disintegrating...

#### Game

Playing the part of the ship's supervisor, your task is to expel water from different sections of the ship via hydraulic pumps, to give the ship's semi-organic outer shell time to repair itself. The water enters each section through a network of pressure-relieving pipes, and must be directed towards a collecting vessel using several manipulating blocks. This must be accomplished within a time limit, before the pressure becomes too great.

The various sections of the ship contain numerous features to further complicate your task. Pressure valves, dissolving blocks and filters all affect the flow of the water. Additionally, the water's presence has disrupted the ship's computer, which is now intent on terminating your existence using the on board weapons' systems, although it is possible to acquire fire power of your own.

As the *Orcna* is an exploration ship, it contains many strange alien life forms, gathered from distant galaxies. The now chaotic computer has taken upon itself to release these creatures from their confining cells, and the aliens are rampaging freely throughout the ship. Needless to say, several of these species are particularly unpleasant. Your task is to prevent the disaster that would occur were the *Orcna* to succumb to the icy water that is flooding into the ship. Your task is to prevent a cataclysm.

#### Program

Cataclysm is a stunningly original and unique game. As well as incorporating conventional sprite and pixel plotting techniques, a cellular automata is employed to generate realistic fluid motion. A simple set of rules is applied to each individual droplet of water, with hundreds of droplets forming a dynamic fluid which flows around the various on-screen objects. The water will adopt the shape of any container, and even exhibit tiny air bubbles. Later levels incorporate extended fluid routines to create frothing acid, and coloured liquids that mix on contact. Optimised sprite routines allow the presence of various aliens and over one hundred parabolic particles and bullets, all moving extremely smoothly at a high frame update rate.

Guiding the water through the various features and into the collecting vessel requires logical thought, coupled with arcade reflexes. Cataclysm successfully combines both puzzle solving and shoot'em up elements to create an immensely playable and enjoyable game.

#### Technical Specifications

50 Hertz cellular automata generates realistic fluid motion.

Over 1000 individual droplets of water on screen simultaneously.

Water, sprites and over a hundred independent particles and bullets updated at 50 frames/second.

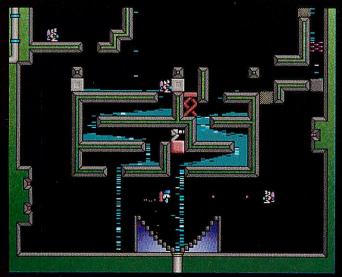
 $256\ colour\ graphics,\ 320*640\ pixel\ playing\ area\ with\ superbly\ smooth\ animation\ and\ scrolling.$ 

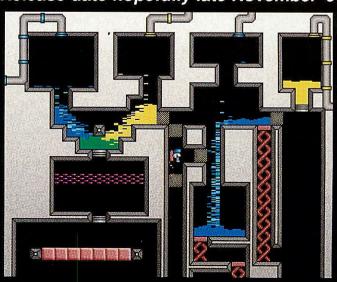
Over 500k of superb sampled music and sound effects.

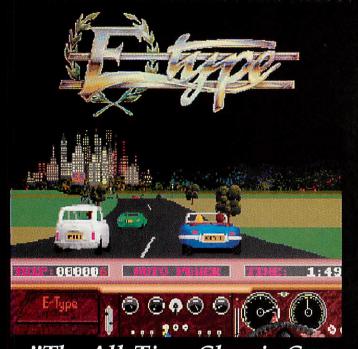
40 increasingly complex and difficult levels.

Numerous features including valves, dissolving blocks, remote control doors, drip-valves, linear and parabolic guns, increasingly available fire power, various types of aliens, acid, coloured liquids, guided bullets etc...

### BBC A3000 & ARCHIMEDES PRICE £24.95 Release date hopefully late November '91







### "The All-Time Classic Car The All-Time Classic Game"

#### The "E-Type Compendium" includes: The Original E-Type

Take control of £70,000's worth of gleaming "E-Type" and head off for the drive of a lifetime. Hear the digitised roar of the 5.3 litre 12 cylinder engine as you tear along lanes, roads and motorways at speeds over 150 m.p.h..

"E-Type" takes racing simulations into the world of 32 bit RISC processing to bring you a game of a quality that is not often found even in the arcades.

If you are new to car driving you can take the very easy to drive automatic for a spin but experienced drivers can optimise performance using the faster 5 speed manual.

There are hazards galore in the 5 varied scenarios including other cars, roadworks, pedestrians, trees, rocks, bushes, oil spills and many more.

"On the Archimedes the illusion of speed is terrifyingly real and the way the landscape moves in three-dimensional perspective is a joy - a stunning experience." The Independent, Dec'89.

"This is a superb game....the tracks are fantastic." The Times Dec'89.

"No race game on any other machine looks as good." The Times Educational Supplement Dec'89.

#### & The E-Type Extra 100 Miles

This consists of 100 extra miles of very hilly and hazardous roads. They will test even the best drivers to the limit.

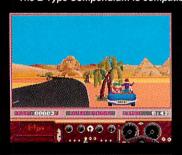
#### & The E-Type Designer

This highly advanced but simple to use designer allows you to design your own tracks. It is enormously flexible to produce an endless variety of tracks to challenge you and your friends.

"The perfect complement to E-Type." The Games Machine Feb'90.

#### BBC A3000 & ARCHIMEDES PRICE £24.95

The E-Type Compendium is compatible with ALL Archimedes computers









# Boogie Buggy



# "A Totally Original Game with Stunning Animation"

Boogie arrives at Dodge City to find that the Evil Monster Lord has taken control and set about converting power-ore, which is extracted from a mine in the centre of the city, into evil-ore, which he is using to transform all the good in Dodge City into evil. As the Evil Monster Lords' power increases, he proceeds to turn Dodge City into a stronghold for creatures of darkness and other evil monsters, and plots to take control of Bumper World. Boogie has not yet been influenced by the evil-ore and so it is up to him to thwart the Evil Monster Lords' plans.

To do this Boogie must travel across Dodge City counteracting the effect of the evil-ore in each zone by collecting lumps of power-ore, and returning them to the mine. Boogie must also destroy each of the Ore Conversion Plants (O.C.P.'s), before finally meeting the Evil Monster Lord in the Ore Core.

"The first thing you notice about Boogie Buggy is that the graphics are gorgeous. The game uses the border as well as the main playing area by about 40% and the effect is stunning." BBC Acorn User, Sep '91.

"Boogie Buggy sets new heights in presentation, the whole program is a feast for the eyes. Take a look at the lily pond for example, it's breathtakingly good....Boogie Buggy is totally original, packed with action, great sound, catchy music and above all incredible graphics and animation....it's brilliant." Syracuse, Summer '91.

"Coming on three discs, it's certainly a vast game and only just runs on a 1 megabyte machine...Graphics are probably the most pretty and colourful I have seen on an Archimedes, with plenty of plants, flowers and wildlife, all well-drawn in cartoon style artwork...On the whole it's a well thought out and designed game which is addictive too." Micronet, July '91.

#### BBC A3000 & ARCHIMEDES PRICE £24.95

Boogie Buggy is compatible with ALL Archimedes computers









# Chocks Away Extra Missions











#### CHOCKS AWAY

This new upgraded Mark II Chocks Away with supersmooth animation really is flight simulation the way you've always wanted it. It has everything for the beginner and the expert: \*Beautiful 256 colour graphics and 'nerve shattering' digitised sound

\*Easy to fly, yet highly manoeuvrable bi-plane - ideal for all ages/ skill levels

\*Revolutionary 2 Player Option using split screen display. This allows 2 players to each fly their own planes simultaneously in practice, dogfights or missions

\*Full joystick, dual joysticks, mouse and keyboard control options \*Amazing "Black Box Flight Recorder" included so that you can record your own flights and then save and replay them. 90 minutes of totally absorbing pre-recorded training flights are included with the game

\*Internal/External views of your plane can be selected from front/ rear/left/right

\*Powerful 30mm cannon capable of very rapid fire and long range

\*Easy to read instrument panel and simple controls

3 very varied immense maps to explore - approximately 18000 km<sup>2</sup> in total

\*20 fascinating and varied missions of increasing complexity are included with a promotion system from Cadet right through to Marshal of the BAF

\*Superb range of targets/enemies including bombers, triplanes, fighters, tanks, control towers, anti-aircraft guns, HQs, patrol boats...

### THOCKS AWAY EXTRA MISSIONS

This consists of a new manual and a disc containing an additional 26 missions (6 of which are reconnaissance missions). It is loosely based on the original Chocks Away and features an extensive range of extra features and improvements. To run it you will require the MkII version of the original Chocks Away. Extra features include:

\*16 new & detailed maps based over land & sea. \*20 enemy planes and 20 enemy targets are included in each mission. Over 1000 extra targets and planes have been carefully defined.

\*Considerably improved action on all missions with plenty of targets to shoot at and plenty shooting at you.

You can view the action from any of the enemy You can view the action from any of the enemy planes or targets and your own control tower at any time even while still controlling your own plane or watching a saved flight. There is a selection of tracking cameras (with adjustable zoom lenses!) around the playing arena. In addition a phantom plane can also be selected to follow the action on any of your black box flight recording. recordings.

\*Improved enemy pilots capable of performing loops, rolls, stall turns etc.. All enemy planes are carefully modelled using the same equations controlling your own plane. This ensures both an accurate and fair simulation.

Three Engine Fighters, Enormous Cargo Planes, Airships, Barrage Balloons, Gun Boats, Oil Tankers, Trains etc..

\*Six reconnaissance missions where required to take photos of various installations with your new on board camera.

Improved graphics over the 16 maps including Complex Cities, Houses, Railways, Roads, Rivers, Bridges, Lampposts, Railway Stations, Oil Rigs, Piers, Beachs, etc. to mention but a few. In total

over 100 different graphics have been defined.
\*Serial Port Link Up option so that you can link up 2 BBC A3000 or Archimedes computers and 2 pilots can fly simultaneously in full screen mode.
\*Extensive enemy flak guns and improved enemy

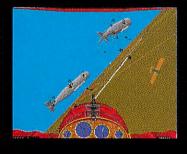
plane guns help make the new missions both more interesting and challenging to say the least!
\*Improved digitised sound effects plus, of course, all

extensive options which are available with the original Chocks Away.

#### WIN a Superb . . . . . "Radio-Controlled Biplane"

Successful completion of all 6 Reconnaissance Missions will allow you to enter this competition

TALLY HO GINGER!









£24.95

#### ARCHIMEDES & BBC A3000

All versions are compatible with the BBC A3000 and ALL Archimedes Computers

CHOCKS AWAY (Mark II Version with 1 or {split screen} 2 player options) CHOCKS AWAY EXTRA MISSIONS (With 2 player Serial link option) £19.95

CHOCKS AWAY COMPENDIUM (Chocks Away & the Extra Missions) £39.95

CHOCKS AWAY NETWORK (Econet/Midi etc. - Ring for Availability & Price)

#### Chocks Away Reviews

Chocks Away Mark I Version was awarded GAME OF THE YEAR 1990 by Acorn User, A&B Computing (now Archimedes World), Risc User & Micronet.

"Graphics in the game are superb, smooth and with plenty of ground detail......this is a really enthralling flight simulator with plenty of variation and features to ensure longevity." Risc User, Dec '90.

"Chocks Away is a delightful game." Archive, Jan '91.

"Chocks Away is a brilliant game." BBC Acorn User, Dec '90.

....it's a really great game. Playability 10. Value 10." The Micro User, Jan '91.

"(Chocks Away Mark II Version).. The increased speed obviously makes the game more responsive and fun to play, well and truly overtaking Interdictor II as the best Archimedes plane game." New Computer Express, Feb '91.

#### Extra Missions Reviews

"I reckon Chocks Away is probably still the best game available for the Archimedes/A3000." BBC Acorn User, August '91.

'How do you improve on a game that left me rushing for my Thesaurus to describe it? Well, those guys at 4th Dimension have delivered the goods once again, and have somehow managed to improve on the best flight simulation on our humble Arc." Club A3000.

'Chocks Away remains, above all, fun. It doesn't really sacrifice realism, but it also doesn't make controlling the aircraft so complicated that you haven't got time to enjoy the game.." Syracuse, Summer '91.

'If you haven't yet seen this game, the screenshots in the 4th Dimension's latest adverts don't do the game justice, simply rush out and buy it. Beware though, once you've played it once, you'll never have another early night." Micronet, June '91.

# Enter The Realm





## A Superfast Adventure into Arcade Action



Combining fast arcade quality action and graphics with the element of adventure and surprise. Meet strange characters, build up your weapons and eventually meet evil in mortal combat.

#### The Background

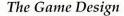
Travel back to Karidor, a land lost in antiquity. A land of evil, a land of good. A land where almost anything can happen and probably will. A land of magic and a land of beauty. So your quest begins..

The land of Karidor was a quiet world much like Earth. It had mountains, it had seas. It had forests and it had deserts. Even the people were similar, but one thing was different. This was the fact that magic did exist there.

For many acons the land was untroubled by any great power until one fateful day where everything changed and evil took control. Evil had always existed of course, but had been in balance with the good of the gods, who were neutral. That day however, the balance was tipped.

It turned out that the ancient prophecies of Karidor had proclaimed this event thousands of years ago. The prophecy stated that evil would overthrow the Realm and only one man, a knight of goodly heart and fearsome ability could reset the balance again. The knight was named Kharas.

Enter the Realm challenges you to lead Kharas in his conquest against evil. On the way, dangers will befall you and surprises will await you...



Enter the Realm is the first game to feature true parallax scrolling on the Archimedes and A3000 computers. The whole play area is created from layers which slide over each other creating a true 3 dimensional backdrop upon which the game proceeds.

The game features fast spectacular graphics which are all hand drawn and realistic digitised sound effects and speech which are totally interactive with the action all around you. Everything else in the game will be left as a suprise!

#### Specifications

Over 2 megs of high quality realistic graphics, all hand drawn. Over 130k of in-game digitised sound effects and speech. Over 150k of music by Peter Gillet.

50 frames per second arcade quality scrolling, animation and movement. 6 layer FULL parallax scrolling of play area (forget immitations!). Massive sprites.

Realistic weather effects and intelligent adversaries. Control via keyboard or RTFM joystick.



### BBC A3000 & ARCHIMEDES PRICE £24.95 Enter The Realm is compatible with the BBC A3000 and ALL Archimedes computers









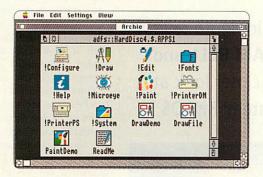


# Announcing colour graphics conversion between the Acorn Archimedes and the Apple Macintosh



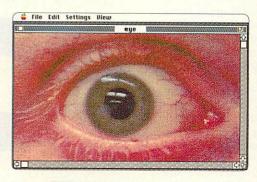
#### BBC Micro, Master 128, or Master Compact

Convert to or from a BBC Screen Dump in any appropriate mode, including Teletext. You can dynamically adjust the colours assigned to each logical colour in the original dump, to take account of different palette settings.



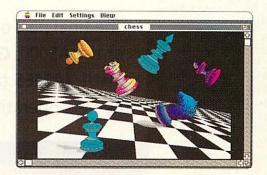
#### **Acorn Archimedes**

Convert to or from an Archimedes Sprite in any appropriate mode. If the file contains several sprites you can select the one you want from a list of their names.



#### Macintosh

Convert to or from PICT, Colour PICT, or MacPaint format. Images can be manipulated in drawing and painting programs, or placed in other Macintosh applications, such as PageMaker, for subsequent colour printing.



#### Microsoft Windows 3.0 on the IBM PC

Also ... convert to or from Windows 3.0 .BMP files with up to 256 colours – the standard format for saving Windows screens, or for creating pictures in Paintbrush on the PC.

| Name             | Acorn Archimedes and Apple Macintosh:                                                                       |
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corn's new A5000 computer is an interesting machine in its own right, but it is the inclusion of an updated operating system -Risc OS 3 – that has perhaps created most interest.

As well as providing an improved foundation for all existing Risc OS applications, Risc OS 3 also features many new or modified applications these are sure to be of interest to both current and new Archimedes users.

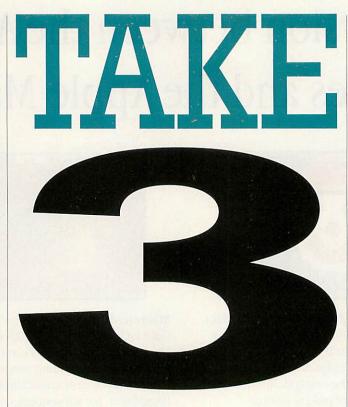
Like previous Acorn operating systems, Risc OS 3 is held in Rom. And, as the Roms are much larger than those in previous Archimedes - 2Mb in total - many of the main applications and resources are also held in Rom, which means that they do not need to be loaded from disc, and do not take up much Ram space.

All of the familiar 'core' applications are included in the Rom - in particular Draw, Paint, Edit, Config and Alarm - and all are considerably enhanced. Also included in the Rom are the Trinity, Homerton and Corpus font families (otherwise known as Times, Helvetica and Courier). Other new applications, like Font-Print, the printer manager and TltoFont are provided on disc, together with old favourites such as the Patience and Lander games.

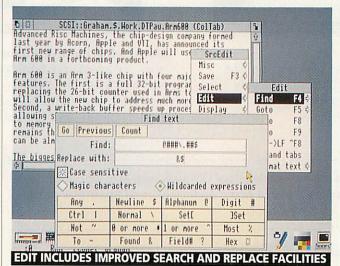
#### DRAW

Draw is the application that is most obviously improved. Draw is an object-based drawing package - pictures can be built up from straight lines and curves in a variety of styles, from other shapes (like rectangles), and from text in a variety of typefaces. Each object in the drawing can be edited individually, coloured, moved, resized and so on, to build up the required effect.

Always the most approachable of the main applications, Draw is now more impressive because it benefits from the new outline font manager (also in Rom). This means that text objects can be rotated to any angle in the same way as other objects - by dragging their 'handles'. Rotated text can have all of the attributes of normal text: colour, typeface, size and so on, can all be changed. All text



In the final part of our in-depth review of the A5000, GRAHAM BELL and PAUL JAMES take a closer look at the new operating system: Risc OS 3



objects are now editable, even when rotated, so a spelling mistake no longer means retyping the whole line of text. And, although there is now much less need to change text into outlines, there is a menu option to do just that. You no longer need a separate utility, such as FontDraw. In the same way, sprites can now be

rotated just like normal objects and text. This means that you don't have to use Paint separately to rotate sprites before you import them into Draw.

Another pair of impressive effects are the interpolate and grade features. Here, two similar objects can be grouped. Grade produces a series of extra objects between the first two, but with their colours graduated from one to the other. So grading from a big black circle to a small white one would create the effect of a circle grading smoothly from black through grey to white in centre. Interpolation between two objects produces a 'grading' of shape, rather than of colour.

To speed up drawing for experienced users, there are a series of Control and function key shortcuts that duplicate what is available on the menus - F4 groups objects, F1 controls the grid lock, and so on. Also, a complete history of your actions is kept, so there is the option to undo and redo your changes, right back to the very beginning of the drawing. The undo buffer size is controlled from the desktop Boot file. Other user-defined defaults can also be included in this boot file, such as paper size, grid lock and zoom. This allows Draw to be tailored to your individual preferences. Also, when a file is saved, all Draw settings are saved along with it, and each draw file loaded can have different settings of grid size, and so on.

Draw still lacks a few touches - a hierarchical font menu à la Impression would be much clearer than the long list you get. And auto-tracing around sprites and a real graduated fill would still be worthwhile additions.

Another that would be particularly useful in Draw, as well as other Risc OS applications, would be the autoscrolling of long menus - for example, font menus - but this has not been implemented. But nonetheless, Draw now incorporates many of the features on most users' wish-lists.

#### **EDIT**

Like Draw, Edit now benefits from the built-in outline font manager and font families, and a series of function key commands to make editing easier. Where possible, the shortcuts are standardised, so F3 saves a file in both Draw and Edit. Both use an unlimited number of fonts - the Risc OS 2 versions could not deal with more than a handful of type families.

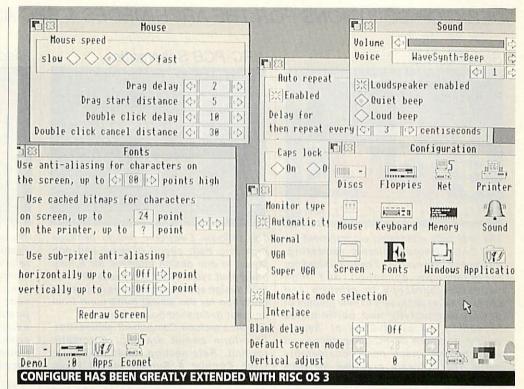
Although Edit remains a 'text editor' and not a wordprocessor, its 'text processing'

features have been improved. It is now possible to wordwrap text automatically as you type, so when you reach a preset formatting width, the next whole word will go down on to the next line - you don't have to press Return each time. You still set the width with the old Format text option, and there is still no way to reformat the whole text to a new width - you have to do one paragraph at a time.

To improve things further, you can overwrite text as well as insert, and the Tab key can be made to tab in columns. The width of each column is set at eight characters.

The search and replace facilities are better too. The 'magic characters' system has been supplemented by a wildcard system that is more in line with the Master 128 Edit. These wildcards can be very powerful when used correctly. For example, all non-printable characters can be replaced by searching for characters that are not between ASCII values of space and backslash, and replacing them with nothing. This is represented by 7-1-15) the 's means not carriage returns, so they are ignored. A word count can be achieved by searching for strings containing mostly alphanumeric characters, such as, %@, and then clicking Count.

Finally, Edit can now edit Basic programs: in effect, many of the facilities of the widely-known BasTxt converter are now built-in, and Basic programs can be loaded into Edit by dragging or Shiftdouble clicking. In fact, Shiftdouble clicking on any file -



whether a drawing, sprite, spreadsheet or whatever - will load it into Edit. A useful feature is that line numbering can be completely transparent, and you can resave your edited program over the original Basic one. Then, double clicking on it will run it as usual. with the modifications.

#### PAINT

The third of the core applications - the sprite editor, Paint - has, it seems, changed the least. It unfortunately retains some serious bugs, particularly with the now much faster sprite rotation option. However, creating sprites may now be a little less intimidating to new users: clicking on

the Paint icon immediately creates a blank sprite rather than simply opening a window within which you have to use the Create menu option. Again, this can be controlled from the desktop Boot file using system variables, as can the option for opening Toolbox and Palette automatically when editing a sprite.

Three new menu options allow you to further modify a sprite, by reducing, magnifying, stretching it vertically or horizontally, or shearing it left to right. A few inconsistencies have been ironed out. The transparent colour used to create sprite masks can now be used in fill operations just like any other colour. Transparent will replace any other colour, and can itself be replaced, either locally or across the whole sprite.

The brush option (which is useless until you click on Shape) now has square and triangular brushes built in, along with the old eliptical brush. And the Grab Screen area option - which was unable to grab a picture including a menu - now incorporates a delay, giving you time to compose exactly the screen you want, before the 'snapshot' is taken. But there is still no 'hot key' grabbing.

Acorn has not taken the opportunity to broaden Paint at all. It is not a painting package in the sense of Revelation or Artisan, and there is still no support for importing nonsprite images, or for TIFF files, in Risc OS 3.

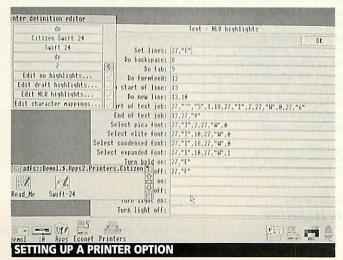
#### CONFIGURE

One process that has undergone major changes is that of configuring the machine. The Configure application is stored in Rom, and clicking on it after it has been loaded produces a filer style window, where each of the icons represents a group of possible configurations.

What would have been a double click, but is in fact a single click on one of these icons, pops up a dialogue box with the individual options in it. For example, clicking on the sound icon brings up a dialogue box with the volume slider and the option to change sound voices.

Extended mouse configurations not only let you alter the speed of the mouse, but also how fast or slow you have to double click to register a double click, and how far you are allowed to move the mouse away from the first click ideal for first-time users inexperienced with the mouse.

You can also alter how far the pointer moves and how long you have to hold down a button before a drag starts.



# SILICON VISION

DESKTOP SOLUTIONS FOR THE ARCHIMEDES & BBC A3000

SolidTOOLS



The first fully integrated environment for 3D CAD, Photo-realistic rendering, Interactive animation, Texture mapping, Programmable animation and high resolution hardcopy to printers and plotters taking designers to new heights of design productivity and performance exceeding the capabilities of 'heavyweight' packages on PC-compatibles and workstations which cost considerably more. The software provides 3D CAD facilities for Architectural, Engineering and Interior design offering a turnkey solution satisfying all your conceptual design and presentation requirements.

"Puts Silicon Vision at the top of the CAD market" - A&B Computing November 1990.

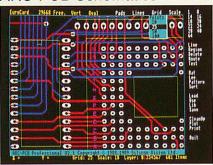
#### SolidsRENDER



The most advanced Ray Tracing package for the Archimedes producing photorealistic images of designs taking into account multiple colour light sources, reflections, shadows, transparencies, refractions and textures for the highest quality pictures from the leading 3D graphics experts renowned for technical excellence. The high-speed ray tracer provides anti-aliasing for smooth edges, motion blur effects, and variable camera lens for wide angle and telephoto effects.

"SolidsRENDER offers the most comprehensive and advanced object properties ... the fastest ray-tracer outputting the highest quality images" - A&B Computing November 1990.

ARC-PCB Schematics

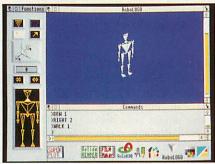


The ultimate Electronic design package providing both circuit drawing and pcb layout in one design interface for a fully integrated system that surpasses all other PCB design systems in features & speed of operation for the fastest turnaround from concept to finished board design.

Features include Component schematics, Free-form circuit drawing, Automatic routing, Rats-nesting, Multiple-layers, Oval, Circular & Surface mount Pads, Component Pulling, On-line Help, Digital & Analogue tracks and up to 300,000 components. Take the lead for your PCB designs before your competitors do.

"Performs up to professional standards. Most comprehensive available on any micro" - BBC Acorn User February 1989.

#### RoboLOGO



This new extension to traditional LOGO, provides three dimensional control of an articulated humanoid or animal figure based on the standard LOGO language. Natural commands such as 'Walking', 'Turning', 'Bowing', and 'Picking', etc are automatically represented graphically by natural movements of the 3D figure which is readily understood by students using LOGO as an introduction to computing. The traditional Turtlegraphics & 3D Glider features are also supported for students to further explore their school work.

"Takes turtlegraphics and LOGO programming into a new dimension. The things that the robot can do are only limited by imagination!" - Educational Computing April 1991.

RiscBASIC

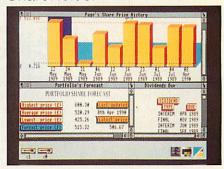


The best BASIC V compiler money can buy. Features include an optimising compiler, relocatable modules with multiple star commands, Window-based or command line compilation environment, standalone code generation, in-line assembler with powerful floating point mnemonic extensions and a Desktop developers environment from a leading Software for technical House renowned excellence.

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"very useful indeed for development work...produced significantly more efficient code" - Micro User July 1989.

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- Archimedes World March 1991.

Product Catalogue

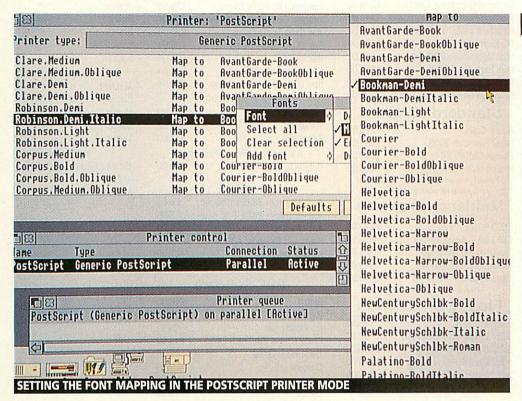
# For more details on these and other

software products in our range please enquire for a free copy of Silicon Vision's 'Desktop Solutions' product catalogue.

All RISC OS software run in native mode on all Archimedes Computers & BBC A3000 with 1 Mbytes.

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Small changes like this can make a surprising difference to the 'feel' of the desktop. There is, however, no 'ballistic' option that some of the PC mice can provide.

In the screen configuration dialogue box, a blanking delay can be specified (the time before the screen blanks during periods of inactivity) and the start-up screen mode, although the A5000 will usually make this decision. All configuration options now take effect as soon as the dialogue box is closed - for example, you can remove hard drives on the icon bar on the fly, albeit with a warning first.

Finally, each one or all of the Rom applications can be configured to load on start-up, so your machine can start-up with Edit loaded, for example.

#### ALARM

Risc OS 2's Alarm application is simple. It puts a clock on the icon bar and allows you to set screen reminders of future The new version is events. the superficially same. although the alarms can be set to repeat in a more sophisticated way. It is possible to have alarms sounding only on certain days, or even just on weekdays. You can even set it to go off every second Tuesday of the month if you want. But the best thing is that it can easily be set to run any file instead of giving a screen reminder. You just drag the file into the Set Alarm dialogue. Firing up a particular application every day at 11pm might not be all that impressive, although running a sampled sound file could be, perhaps to give you a verbal reminder of something.

What tasks do you do every day? Collect electronic mail? Back up your network? Both of these are already possible. As more applications incorporate scripting, or some element of 'programmability', then this feature will become more powerful and useful.

#### APPLICATION DISCS

Acorn's Font manager uses its own system of outline fonts. These are not compatible with the Type 1 Postscript fonts that are used throughout much of the professional publishing industry. Two Risc OS 3 applications on disc are intended to bridge the gap.

The simplest is FontPrint, which allows Acorn-format fonts to be converted into Postscript form and either saved or sent to a Postscript printer. The printer stores them, and then the font can be used to print any Acorn document thereafter.

So the many non-Postscript compatible fonts in the EFF or Longman Logotron catalogues can now be printed on Postscript printers or typesetting machines. TltoFont goes the other way: Postscript fonts can be bought on Mac or IBM discs for about £50 per face. This is expensive in Acorn terms, but there is a huge range of high-quality fonts available which can now be converted into Acorn format and used on the Archimedes. However, the conversion is not perfect, and hinting in the Postscript font cannot always translated into 'scaffolding'. The on-screen representation of converted faces may be a little ropey. Nevertheless, TltoFont will prove a boon for professional Archimedes users.

Other simple utilities on the Applications discs include: Squash, a small utility that will toggle the state of a file compressed between and uncompressed; SciCal, which is a more advanced calculator; which Maestro, has changed, and Magnifier, which now loads on to the icon bar.

New users may find that after playing Lander, the fast machine becomes a little sluggish. Don't worry - this is only because Lander turns off the Arm3's cache and does not bother turning it back on again. This can be cured with a CACHE ON command.

#### PRINTERS

If there was one thing that might have confused users of Risc OS 2 it was - and still is - the printer drivers. Printers are strange beasts - they are mostly standardised, offering Epson compatibility, but some models break out of this mould, and offer extra features.

They are, in fact, very simple, but if you have a printer that does not conform, then having to edit the PRData files can be a somewhat testing experience.

The Risc OS 3 printing software bears little resemblance to its predecessor. In fact, there is only one printer manager, on to which is dropped a printer configuration. There are many predefined configurations, which are all well researched and very detailed, even down to special character sets and little idiosyncrasies of certain printers.

It is now possible to have several different printers on the icon bar at once, and the active one that receives data is highlighted by clicking on it - the others are greyed out. This might be used if you had a network Postscript printer and a dot-matrix connected to the parallel port of vour machine.

If it is necessary to alter one of the supplied printer description files, then PrintEdit provides a far friendlier front end than manually adjusting the descriptions with Edit.

Double clicking on a printer definition file will load it into PrintEdit. This allows you to alter highlight codes in three possible printer modes - plain, draft and NLQ (near letter quality), because they often vary between modes. Character mapping is also implemented - this means that, for characters above 128 (which can be entered using Alt and the keypad), a string of printer commands can be obeyed instead. For example, character 150 could switch the printer to IBM emulation mode, print a vertical bar, then return to default mode.

Adding a new graphics mode is as simple as entering the resolution. Clicking on this new resolution pops up a window, in which you tell the driver what codes to use to select the mode, perform a line feed, and so on.

So the new printer driver system offers the ultimate in 'tweakability' for printers not covered by the defined drivers.



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#### **Acorn Hardware**

| - |                                                                       |          |
|---|-----------------------------------------------------------------------|----------|
|   | A540 inc. 4Mb Ram, 120Mb HD,                                          |          |
|   | Arm3, Taxan 775                                                       | £2495.00 |
|   | A5000 inc. 2Mb Ram, 40Mb HD,                                          |          |
|   | Arm3, Acorn Multiscan Monitor                                         | £1499.00 |
|   | A5000 Learning Curve                                                  |          |
|   | as above c/w Audio Training Cassette,                                 |          |
|   | Guide to National Curriculum, Acorn                                   |          |
|   | Applications Suite, Pacmania,<br>PC Emulator, Genesis, 1st word Plus, |          |
| 6 | Acorn DTP                                                             | £1531.06 |
|   | A5000 LC / Acorn Printer                                              |          |

| 710000 LO 771001111 HIIIO   |          |
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| as above c/w Acorn JP150    |          |
| Inkjet Printer              | £1765.96 |
| A420/1 2Mb Ram, 20Mb HD     | £1099.00 |
| A410/1 c/w 2Mb Ram, 20Mb HD |          |
| upgrade fitted by ourselves | 6800 00  |

| A3000 c/w 2Mb Ram fitted              | £599.00 |
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| Guide to National Curriculum, Acorn   |         |
| Applications Suite, Pacmania,         |         |
| PC Emulator Genesis 1st Word Plus     | £642 29 |

| PC Emulator, Genesis, 1st Word Plus | £642.29 |
|-------------------------------------|---------|
| A3000 LC / Acorn Monitor            |         |
| as above c/w Acorn Colour Monitor   | £855.05 |
| A2000 LC / Acorn Monitor /          |         |

| Acorn Printer           |          |
|-------------------------|----------|
| as above c/w Acom JP150 |          |
| Inkjet Printer          | £1089.95 |

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| Acorn Serial Upgrade, Morley User/Analog | ue   |
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| Technical Reference Manual | £65.00  |
|                            |         |

#### A5000 Upgrades

| 2Mb Ram Card               | £129.00 |
|----------------------------|---------|
| Technical Reference Manual | £65.00  |

#### A400 Upgrades

| 1 Mb Ram                    | £35.00  |
|-----------------------------|---------|
| 2 Mb Ram                    | £65.00  |
| 3 Mb Ram                    | £99.00  |
| 20 Mb Hard Disc (ST506)     | £99.00  |
| 40 Mb Hard Disc (ST506)     | £245.00 |
| 5.25" Ext. floppy disc int. | £30.00  |
| ARM 3 Upgrade (Aleph 1)     | £289.00 |
| Econet Module               | £46.00  |
| VIDC Enhancer               | £29.00  |

#### A3000 Upgrades

| 1 Mb Ram (2 Mb in total)     | £55.00  |
|------------------------------|---------|
| 4 Mb Ram                     | £159.00 |
| 5.25" External f/disc buffer | £39.00  |
| Serial Upgrade               | £19.00  |
| Serial Link Kit (BBC-Arc)    | £14.00  |
| User & Analogue Podule       | £46.00  |
| User & Midi Podule           | £46.00  |
| VIDC Enhancer                | £29.00  |
|                              |         |

#### **Expansion Cards**

| ArVis S-VHS Video Board       | £295.00 |
|-------------------------------|---------|
| ArVis S-VHS Encoder Board     | £145.00 |
| ArVis Video Graphics Board    | £877.00 |
| Chroma 345 Overlay Board      | £389.00 |
| Econet Module                 | £46.00  |
| Ethernet Expansion Card II    | £249.00 |
| Floating Point Expansion Card | £449.00 |
| Hawk V9 Video Digitiser       | £199.00 |
| I/O Expansion Card            | £79.00  |
| Midi Upgrade to I/O Card      | £27.00  |
| Midi Expansion Card           | £65.00  |
| ROM Expansion Card            | £45.00  |
| SCSI Expansion Card (Acorn)   | £229.00 |
| Ctandard Manit                | 040     |

#### Standard Monitors

| otaliaala illo                  | 1111010 |
|---------------------------------|---------|
| Acorn Colour                    | £199.00 |
| Microvitec Cub 3000             | £199.00 |
| Philips CM8833 II               | £199.00 |
| Philips Mono (Green)            | £85.00  |
| All monitors come with free lea |         |

#### **Multiscan Monitors**

| EIZO 9060SZ Flexiscan      | £419.00 |
|----------------------------|---------|
| EIZO 9070SZ Flexiscan ^    | £599.00 |
| Taxan 775 Multivision      | £389.00 |
| Taxan 795 Multivision ^    | £449.00 |
| Taxan Viking II Mode 23    | £749.00 |
| * comes with free VIDC enh | ancer.  |
|                            |         |

#### **Floppy Disc Drives**

| 5.25" Single 40/80 no psu   | £95.00  |
|-----------------------------|---------|
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| 5.25" Dual 40/80 with psu   | £199.00 |
| 3.5" Single with psu        | £85.00  |
| 3.5" + 5.25" 40/80 with psu | £209.00 |
|                             |         |

#### Printere

| Filliters                   |          |  |
|-----------------------------|----------|--|
| Canon Bubblejet BJ-10e      | £239.00  |  |
| Sheetfeeder for BJ-10e      | £59.00   |  |
| Citizen 120D+               | £114.00  |  |
| Citizen Swift 9             | £169.00  |  |
| Citizen Swift 24e           | £239.00  |  |
| Colour Kit for above        | £39.00   |  |
| Citizen PN48 Portable       | £249.00  |  |
| Star LC20                   | £130.00  |  |
| Star LC200 Colour (9 pin)   | £189.00  |  |
| Star LC24 - 200             | £219.00  |  |
| Star LC24 - 200 COLOUR      | £259.00  |  |
| Sheetfeeder for LC24 - 200  | £69.00   |  |
| Integrex Colourjet 132      | £519.00  |  |
| HP Paintjet                 | £795.00  |  |
| Laser Direct (Qume)         | £819.00  |  |
| Laser Direct (LBP4 Hi Res.) | £899.00  |  |
| Laser Direct (LBP8 Hi Res.) | £1289.00 |  |
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| Level 4 Software   | £199.00 |
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| Econet Starter Kit | £80.00  |
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#### **Printer Drivers**

| Midnight Graphics              |        |
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| Citizen Swift 24 Sprite Dump   | £26.04 |
| Epson 24 Sprite Dump           | £26.04 |
| HP Paintjet Sprite Dump        | £26.04 |
| Integrex 132 Sprite Dump       | £26.04 |
| Integrex Colourcel Sprite Dump | £26.04 |
| Juki 5520 Sprite Dump          | £26.04 |
| Star LC10 Sprite Dump          | £26.04 |
| Star XB24 Sprite Dump          | £26.04 |
| Star LC200 Sprite Dump         | £26.04 |
| Star LC24-200 Sprite Dump      | £26.04 |
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| Printer JX                     | £13.00 |
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#### Printer CA £13.00 **Electronic Font Foundry** BubbleJet - BJ10e/130e £10.00

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Printer PJ

#### Cables Arc - Monitor - 8833 inc sound Arc - Monitor - 8833 II inc sound £8.65 Arc - Parallel Printer Cable £5.00 Keyboard Extender 400/500 £7.50 Mouse Extender £7.50 Replacement Mk I Mouse Cable £6.50

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| ViewPlot                      | £29.95 |
| ViewSheet                     | £40.00 |
| ViewStore                     | £45.00 |
| Concept Keyboa                | rd     |

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| * Produces overlays which once created with other Archimedes Desktop Applicat                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |                |
| Coommons                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                |

#### Scanners

| Flatbed A4 256 Grey SCSI (CC | J) £849.00 |
|------------------------------|------------|
| Scan Junior Scanner A6       | £169.00    |
| Scan Junior 256 Grey Level   | £199.00    |
| Scanlight Senior Scanner A4  | £329.00    |
| Sheet Feeder for above A4    | £105.00    |
|                              |            |

#### **Archimedes Software**

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|-------------|--------|
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| Craftshop 2 | £29.00 |
| Jiglet      | £29.00 |
| Jigsaw      | £29.00 |
| Poster      | £75.00 |
| SmArt       | £55.00 |
| SmArtFiler  | £35.00 |
| Snippet     | £29.00 |
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| ArcLight | 143.00 |
|----------|--------|
| Euclid   | £40.00 |
| Mogul    | £17.00 |
| Splice   | £26.00 |
| Tween    | £26.00 |
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ANSI C (V 3)

MultiFS

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£65.00

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£15.00

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| Fortran 77                   | £99.00  |
| ISO Pascal                   | £99.00  |
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| Symbol Font Pack             | £39.00  |
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| TCP/IP Protocol Suite        | £199.00 |
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| Everyday Signs      | £20.00 |

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Mah-Jong Patience

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| £10.00 |
| £25.00 |
| £70.00 |
| £99.00 |
| £45.00 |
| £90.00 |
|        |

#### Colton Software

| Pipedream 3       | £105.00 |
|-------------------|---------|
| Pipedream 4       | £179.00 |
| Computer Concepts |         |

#### AvanteGarde Font Pack

| 124.00     |
|------------|
| £24.00     |
| £39.00     |
| £39.00     |
| £12.00     |
| ent £39.00 |
| £125.00    |
| £70.00     |
| £29.00     |
| £29.00     |
| £99.00     |
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#### Cygnus Software

| Iron Lord      | £14.00 |
|----------------|--------|
| Tower of Babel | £14.00 |
| Twin World     | £14.00 |
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| rc DFS |                   | £22.00 |
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| Landmarks No's 1 - 4         £19.00         Worra Plotter         £24,00         The Real McCoy 2         £20.00           Magpie         £55.00         Worra CAD         £74.00         The Wimp Game         £14.00           Notate         £55.00         Sherston Software         U.I.M         £18.00           Pendown Outline Fonts         £18.00         Help         £7.95         White Magic         £14.00           Pendown Outline Fonts         £18.00         Animated Alphabet         £19.00         White Magic 2 inc Designer         £14.00           Pinpoint         £69.00         Arcventure         £25.00         White Magic 2 inc Designer         £14.00           Revelation 2         £99.00         Christmas Allsorts (Drawfiles)         £16.00         Blowpipe         £15.00           Chess 3D         £14.00         Farm         £19.00         ARCrem 7         Blowpipe         £15.00           Clainites         £17.35         Fleet Street Phantom         £23.00         Tracker   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| Selladore Tales Space Mission Mada Stig of the Dump Teachers Cupboard Teddy Bears Picnic Viewpoints Viewpoints Wizards Revenge Worst Witch Silicon Vision Ltd  ARC-PCB ARC-PCB Professional Data Word Money Matters Sti4.00 Money Matters Picture Book Target Maths Sti4.00 Target Maths  Euclid 2  Silicon Vision Ltd  ARC-PCB ARC-PCB Professional Data Vision Fill.M-Maker Financial Accountant Send a 24p stamp for FREE sample disc  Selladore Tales Space Mission Mada Sti3.00 Money Matters Picture Book Target Maths Sti4.00  Target Maths Sti4.00  Silicon Vision Ltd  ARC-PCB ARC-PCB Professional Stig of the Dump Sti4.00 Silicon Vision Ltd  ARC-PCB ARC-PCB Professional Stig of the Dump Sti4.00 Silicon Vision Ltd Silicon Vision Ltd ARC-PCB ARC-PCB Professional Stig of the Dump Sti4.00 Silicon Vision Ltd ARC-PCB ARC-PCB Sti4.00 Silicon Vision Ltd ARC-PCB Professional Stig of the Dump Sti4.00 Silicon Vision Ltd ARC-PCB ARC-PCB Professional Stig of the Dump Sti4.00 Silicon Vision Ltd ARC-PCB ARC-PCB 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| Space Mission Mada Stig of the Dump Teachers Cupboard Teddy Bears Picnic Viewpoints Wizards Revenge Worst Witch Sold a 24p stamp for FREE sample disc  Space Mission Mada Stig of the Dump Stig o  | World Championship Squash Le Computer Config Aid SpeedWriter Lingenuity HotLink Presenter Presenter Story Presenter II Longman Logotron ArcComm 2 Landmarks No's 1 - 4 Magpie Notate Numerator Pendown Pendown Outline Fonts Pinpoint Revelation 2 MicroPower Chess 3D Zelanites Midnight Graphics ClipArt 1 over 480 images                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      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| Teachers Cupboard £24.50 Teachers Cupboard £24.50 Teddy Bears Picnic £23.00 Viewpoints £35.00 Wizards Revenge £17.00 Worst Witch £21.50 Drawfile Clip Art. Send a 24p stamp for FREE sample disc  Siligor the Dump Teachers Cupboard £24.50 Teddy Bears Picnic £23.00 Viewpoints £35.00 Wizards Revenge £17.00 Worst Witch £21.50  Silicon Vision Ltd ARC-PCB £149.00 ARC-PCB Professional £299.00 Data Vision £119.00 FILM-Maker £70.00 Film-Maker £70.00 Financial Accountant £199.00  While stocks last                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          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| Viewpoints £23.00 Viewpoints £35.00 Wizards Revenge £17.00 Worst Witch £21.50  Silicon Vision Ltd  ARC-PCB £149.00 ARC-PCB Professional £299.00 Data Vision £119.00 FILM-Maker £70.00 Financial Accountant £199.00  Wizards Revenge £17.00 Euclid 2  3D Graphics Animation Package  £40.00  £40.00  while stocks last                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  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| Wizards Revenge £17.00 Worst Witch £21.50  Improve your documents in leaps and bounds by using Midnight Graphics Drawfile Clip Art. 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| Improve your documents in leaps and bounds by using Midnight Graphics Drawfile Clip Art.  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| Drawfile Clip Art.  Send a 24p stamp for FREE sample disc  ARC-PCB Professional £299.00  Data Vision £119.00  FILM-Maker £70.00  Financial Accountant £199.00  While stocks last                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             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#### **Hours of Opening**

Monday - Friday 9.00 a.m. - 5.00 p.m. Saturday 10.00 a.m. - 5.00 p.m. Lunch 1.00 p.m. - 1.30 p.m.

How to find us



#### Important Facts

- NO Minimum Order Value
- NO Carriage Charges in Mainland UK
- ALL Goods Despatched within 24 Hours, subject to stock levels
- Acorn Qualified Dealer
- Acorn Service Centre
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are automatically scaled so that the parts always fit. Pictures may be saved as Draw files or transferred to DTP programs or any other applications which can handle Draw files.

The smArt package comes with over two dozen files on subjects ranging from shops to cars, and churches to British Isles maps. Available as separate products are discs of smArt files on specific themes such as Leisure, Heraldry, Faces, Fashion, Homes, Trees & Gardens, and Dinosaurs.

smArt £55 (NZ\$ 198)

smArt discs £16 (NZ\$ 59)

For those wishing to create their own smArt files, smArtFiler is an application which compiles smArt files from your source Draw

files. Full instructions are provided along with lots of examples. Individual components may be scaled, rotated, and placed in front of or behind other components. Menu entries may be specified.

If it can be drawn it can be a smArt file.

smArtFiler £35 (NZ\$ 129)

Chameleon is an ideal companion to smArt, and a must for anyone who needs to make quick and easy colour changes to

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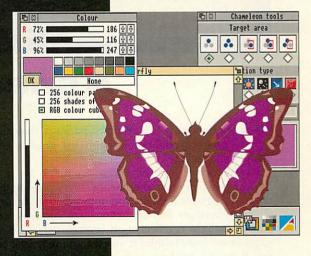
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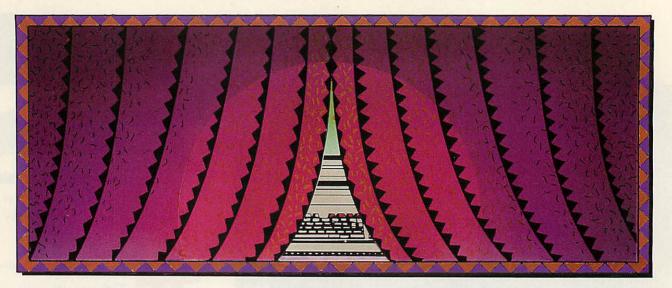


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# What does everyone who creates moving pictures want?



### A sneak preview.

Render Bender is the graphics package that allows the user to produce remarkable animated graphic sequences using Ray Tracing.

Ray Tracing isn't nearly as complex as it sounds. Basically, in a ray traced sequence, every pixel on the screen takes all relevant light sources into account. Ensuring that all the reflections and refractions are correctly calculated even if the light is reflected off several surfaces. The image could be no more faithful if you were filming real objects in real light. To produce such a superb animated sequence, however, was quite a difficult task – Until now.

Illuminator has changed all that. It is a fully RISC OS graphical front end to Render Bender. Allowing the user to create a series of frames manually, or to give it a start point and an end point, leaving it to generate the frames in between. What you are getting is the ability to take a sneak

preview. You can see what you are going to get, before you get it. After you've created your outline frames in Illuminator, you then transfer the files to Render Bender, the fully

RISC OS Ray Tracing part of the package. Which all means that now, to achieve powerful 3D Animation, you no longer have to be a mathematical genius. You just have to be the proud owner of Render Bender 2.



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# GOOD AS NEW

A secondhand BBC micro could help to boost your computer power. CHRIS DRAGE advises on the current state of the market

hanks to the growing number of Archimedes and A3000 owners around, there has never been a better time to buy a second-hand BBC micro.

It's not really surprising that many new or prospective 32bit owners are choosing to sell their eight-bit BBC B or Master computers, to help finance the new purchase. But why would anyone want to buy a secondhand BBC micro, the first version of which was launched 10 years ago?

The answer is the same now as it was then: because it's a really useful machine, reliable well beyond Acorn's original estimate of a five year life span. I am still using my school's original Beeb in the classroom. Purchased 10 years ago, it has been repaired only once, despite constant use.

Furthermore, the old model B is a highly versatile machine which can be used with almost any monitor and dot-matrix printer. It expands well beyond its original specification, with add-ons from a multitude of third party suppliers, and possesses all the ports you could need. You have to pay extra for these on the A3000. In short, the machine has a capability that was unheard of when it was first released. But the real question is - what can it do today?

#### IN CLASS

Educational users are likely to be keen to pick up a secondhand Beeb. As well as working within limited budgets, many establishments have already invested in BBC B software. Add to that the need to put at least one computer in each classroom, and the model B becomes an even more attractive choice. Similarly, the importance of IT in pre-school education has led many people to search for older machines which fit in with their budgets. A lot of software around is ideally suited to this level.

A model B or Master 128, coupled with an external hard disc and modem, will make an ideal low-cost bulletin board. The same is true of specialist applications involving control, monitoring and data logging. Secondary schools can use model Bs for things such as monitoring the weather. The Master 128 is the ultimate



BBC micro with all of the features users said they would have liked in the model B, but without the extra cost.

It has many attributes over the unexpanded B, including additional usable memory, and so represents a better buy if you want to do memory-intensive work, such as wordproor running cessing spreadsheets. If you want to run purely educational applications, however, there is little point paying for a Master 128 – all of the software is primarily designed for the B.

The Master Compact is similar to both the Master and B, but is also something of a hybrid, which was not particularly well supported by anyone when it was launched. This makes it a red herring when you are considering purchasing a secondhand micro.

However, the 3.5in disc format is compatible with the Archimedes. Therefore files written in View, for example, can be saved to floppy disc and loaded directly into an Archimedes Desktop publishing package such as Impression. Advantage can therefore be taken of the superior power of any Archimedes a school may own. Compacts are ideally suited to this type of dedicated operation.

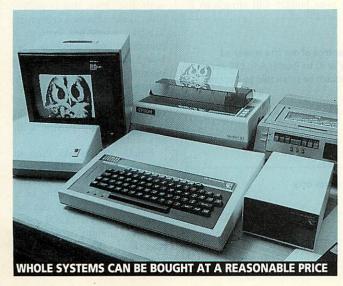
#### WHERE TO LOOK

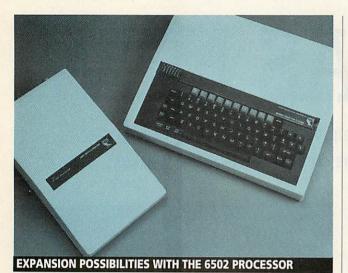
But what about the secondhand market - where are these machines to be found? What features should you look for, are there any pitfalls and, most important, what price should you pay?

Well, in answer to the first question, many dealers sell secondhand machines which are either old display models or have been traded in. Also watch out for the advertisements in BAU. You will be pleased to hear that free reader ads will be making a reappearance in the next issue of the magazine - see the separate coupon on the following page.

As for typical prices, take a look at our price guide. It is remarkable how well the BBC micro has held its price over the years, while its contemporaries have plummeted in value. Recently an advertisement for a network of RM Nimbus machines was asking only £30 per machine.

Obviously such figures are





only a rough guide as, more often than not, people tend to dispose of complete systems in order to start afresh with more advanced computers. Last year, for example, my school was able to purchase an elderly BBC B plus mono monitor and 40 track disc drive for just £200.

There are several points to be aware of when considering buying a secondhand model. Firstly, aim to buy a complete system suited to your needs. You don't want to spend more money than you have to, and bringing a cheap secondhand system up to the required specification could end up quite expensive, defeating the whole object.

Buying a printer for a secondhand system is an investment for the future, but spending £200 on a colour monitor is another matter altogether. Unless it has both linear (TTL) and analogue (RGB) inputs, you may not be able to use it at a later date

with an Archimedes. See your local dealer about a Philips model, designed for used with either system.

To a lesser extent this advice holds true for purchasing new disc drives for any BBC B system. Although an external drive can be later used with an Archimedes/A3000, an additional external disc interface must be fitted.

Always purchase a BBC B with an issue seven mother board. Issue four is only worthwhile if the computer is working and ridiculously cheap. It should also have Basic version 2 and an Acorn DFS version 1.2 fitted. There are many other disc filing systems around, but these cannot be guaranteed to work with all of the software you may wish to run. Many suppliers of double density disc interfaces, for example, no longer support their products.

Your prospective Beeb may be fitted with a Rom or Ram expansion board. In my view, two boards in particular enjoy an enviable reputation for reliability: the Aries B20/B12 Ram-Rom boards and the ATPL Sidewise Rom board.

Any computers fitted with these boards should be reliable and worth the asking price. But again, do be wary of additional add-ons advertised with the machine. A poor quality Rom board can cause the machine to crash constantly until it is removed.

Another reliable and popular Rom expansion system is the Viglen/Care Electronics Rom cartridge system which allows unlimited numbers of Roms to be added to the machine, albeit one at a time. As Roms are encased in sturdy cartridges, they can be slipped in and out quite safely. When it comes to fitted Roms, you have to decide which will best fit your requirements and are therefore worth the asking price. Among the plethora of utility Roms is Advanced Disc Toolkit from PRES Ltd, a program equally at home in a Master 128.

A few extras are always worth having: View and Wordwise Plus are the de facto wordprocessors for the Beeb; Viewsheet and Intersheet spreadsheets are widely used: and Viewstore is a popular database manager.

Model B+ 64K and B+ 128K computers can each be regarded as a half-way house between a BBC B and a Master 128. Their only real advantage over a B is the extra Ram available, useful for the dataintensive applications mentioned earlier. A Master 128 is a much better investment if your budget will stretch to it.

#### **PRICE GUIDE**

Below is a guide to the value of secondhand BBC micros. However, please note that prices may vary considerably, according to the age and condition of the equipment, and whether it is being sold privately or by a dealer: The best deals can often be made privately, but a reputable dealer, on the other hand, may be more reliable.

- Basic BBC B without a disc interface - £110
- BBC B with a DFS and 40/80 disc drive - £220-£275, depending on what else is bundled with the machine in terms of hardware/software. This can range from Rom/Ram expansions to sideways Ram boards and additional disc drives
- BBC B with external hard disc drive - £350-£450
- Basic Master Compact system - £185-£200
- Basic Master 128 £250-£270
- Master 128 with twin disc drives - £320-£360
- Master 128 with hard disc system and additional hardware/software - up to £600
- Master 512 with twin disc drives, ROMs in cartridges and other hardware or software about £500
- BBC B + 64K £150
- BBC B + 128K £160

Its design incorporates all the best features of the BBC system: sideways Roms in cartridges, extra screen Ram. numeric keypad, and so on.

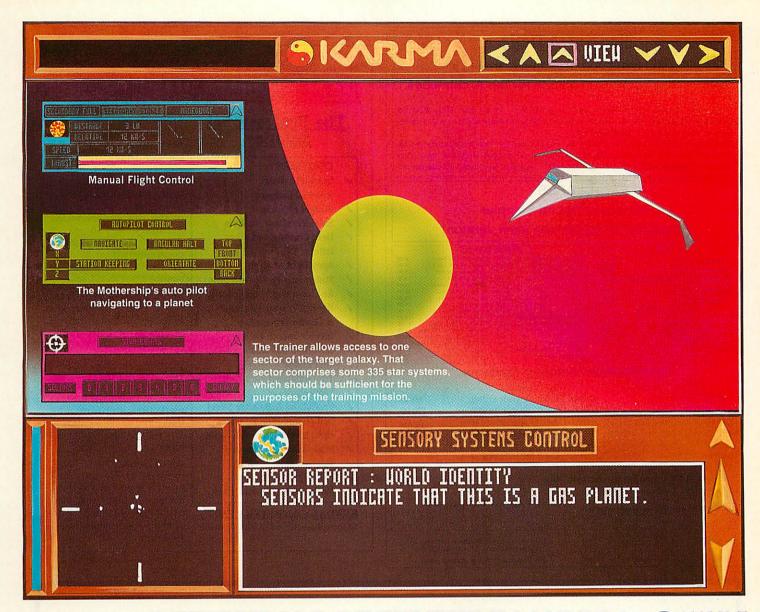
If you are lucky enough to be offered a system mounted in a Viglen Console, complete with disc drive, this is preferable to the standard computer. Trailing wires are kept to a minimum and a separate keyboard has distinct advantages over the normal (fixed) configuration. Whichever secondhand BBC micro you decide on, try to see the system in operation before parting with any money.

Finally, before deciding to part with up to £500 for a secondhand Master 128 system, do consider the benefits of a 32-bit A3000 which can be bought for about £200 more (see next month's BAU). And remember, the motto is, do your homework and buy cautiously. Happy hunting!

#### BAU FREE READER ADS COUPON

If you want to sell your secondhand computer equipment, why not take advantage of our free reader ad service? Simply fill in the details below and send this coupon (or a photocopy of it) to: Reader Ads, BBC Acorn User, Redwood Publishing, 20-26 Brunswick Place, London N1 6DJ. Coupons should be submitted by December

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# SEEING IS BELIEVING

As computer graphics become more popular ROB **MILLER** puts his faith in Illusionist

omputer graphics cover a broad spectrum of topics from simple painting programs to complex ray tracing. The results of ray tracing can be stunning but time-consuming, with the computer taking up to six hours to process an image. In contrast, the images shown on these pages took only one hour to be rendered.

Why? Because they were produced using a program that creates almost photographic results in a short space of time. This is achieved by ignoring the reflections and shadows and plotting objects as a series of polygons. Various algorithms can be inserted in the program, allowing curved surfaces to appear smooth rather than faceted. Light sources can also be simulated to highlight objects and give them a sense of depth.

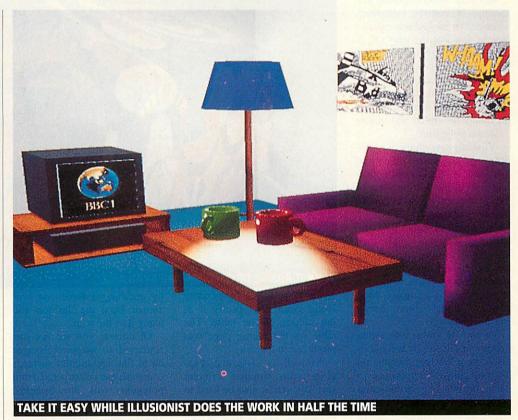
Illusionist from Clares is the program in question. It allows the Archimedes user to produce realistic scenes and objects in a relatively short space of time. As you can see, the results are remarkable.

#### **GETTING STARTED**

Illusionist comes on two discs; one storing the actual program, the other containing some example files and pictures. Both discs can be transferred to a hard disc. To load the program, simply click on the Illusionist icon and it will install itself on the desktop icon bar.

It is entirely mouse-controlled, with just the occasional parameter or filename to be typed in. As it complies fully with Risc OS standards, anyone familiar with the desktop environment should find it easy to get started.

At this point, as always when using a program for the first time, there is the temptation to dive straight in and try



things out. In this case however, I would recommend a different approach - read the manual first and then play. It's not that Illusionist is particularly complicated, but it does use different techniques when compared to other 3D editors.

The main *Illusionist* window displays four views - side, front and plan elevations, plus a 3D projection. It also shows a set of icons for the most useful tools. The area used for each view cannot be changed, although the scenes within them can be scaled up or down or panned in any one of eight directions (up, down, left, right and diagonally).

This approach, with everything on-screen at once, eliminates the need to constantly switch views and certainly speeds up the design process. One drawback is that the overall Illusionist window is of a fixed size, so that users with multiscan monitors and resolution enhancers (such as Atomwide's VIDC Enhancer) can't make use of their increased resolution.

## OBIECT D'ART

Like other 3D editors, scenes can be built up of single polygons, or pre-built shapes such as cubes, spheres and toruses (a doughnut shape).

A polygon can have any number of sides, and be irregular to the point of having sides that bend inwards as well as out (such as a bow-tie shape). To plot a polygon is simply a case of marking the points in the relevant view window. Pre-built shapes are easily placed by specifying their position with a special cursor. For accuracy, switch on the grid which can be anything from one unit upwards.

A special Sweep tool allows users to specify a side profile outline which can then be rotated to form a solid object, such as a goblet. Two parameters control the end result; one being the number of steps taken to complete a rotation, and the other being the number of degrees to rotate through.

If small steps are used the object will have a more rounded look, although this takes considerably longer than large steps. Use the Smooth option on sweeps to disguise the squared look of an object created using a large step.

Sweeps can also be rotated through more than 360 degrees to form spiral shapes. Each time the profile is rotated through 360 degrees, it is offset one unit from its original vertical position. All sorts of coiled shapes can be produced using this method.

A special marking system can be used to label each polygon (or group of polygons) as you create them. For example, you may create a cube and add four cylinders to make a table. The completed image can then be named Table and re-loaded at any time by selecting its name from a list.

Once an object is placed in a design, it can be squashed, enlarged or moved around as a whole. Each of the axes (X, Y or Z) can be toggled on or off to enable selective distortion of shapes. Individual or groups of points can be selected and moved around independently of others to stretch and distort selected polygons.

Virtually any shape is possible, given both time and patience. A special tool is provided to allow any polygon to be extrapolated, in order to create a solid object.

Separate objects can be grouped together and then merged to form a single image which can in turn be distorted. The Smooth option works on even the most complex solid shape, giving some pretty weird results.

Perhaps the most interesting feature of Illusionist is its ability to map existing pictures on to polygons. To produce a table, draw a large rectangular slab, with four tubes for legs. To give the appearance of wood take a picture (either



Mode 12 or Mode 13) of some wood grain and specify it as the colour of the table. The table on the facing page was produced in this way.

As well as using the mapping tool to simulate different surfaces, it can also be used to project pictures and designs on to objects. The monitor screen on the next page was created

by grabbing a screen of Illusionist from the desktop and using it as the map.

Of course, you are not just restricted to mapping images on to flat, rectangular surfaces - any shape constructed from polygons will do. Spheres, cones and toruses are provided, and these can be stretched and squashed to suit your requirements.

As well as being able to paint any screen on to a polygon or object, these can be any one of 16,777,216 colours. This is not just a random figure. but the number reached when you have 256 possible levels of red, green and blue in other words, 24-bit colour.

At present the Archimedes range (including the new A5000) is unable to display more than 256 colours at once. To make use of the extra colours available, Clares has made Illusionist compatible with the Serial Port's Graphics Enhancer podule. This card provides pseudo 24-bit support, and therefore greatly increases the number of colours in the palette.

Pictures created on a machine fitted with the podule

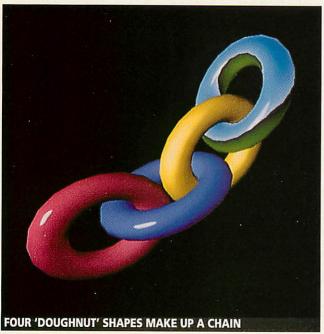
can produce scenes of photographic quality. Because of the vast range of colours available it is virtually impossible to see the joins between polygons, especially when the Smooth option is used.

Colour for both polygons and objects is set by using slider bars (similar to those in Draw) to control the amounts of red, green and blue. For even greater control, red, green and blue levels can be typed in as values between 0 and 255.

### THE LIGHT TOUCH

Although Illusionist does not support shadows cast by one object on to another, it does allow light sources to be positioned to produce shading. Imagine two spheres, with one positioned between the other and the light source. You would expect a shadow to be cast on the sphere furthest from the light.

What Illusionist does is to shade each sphere as if both were in the path of the light. Although artificial, it does work surprisingly well in practise, and it is hard to notice that cast shadows are absent from a scene.





Up to 14 lamps can be placed within a scene, each consisting of a source position and a target position. They can be Points, whereby light will radiate in all directions, or Spots, where the light will travel in a fixed line. The colour of light can be any one of 16,777,216 colours and is set by using the red, green and blue sliders.

In reality, light travels in one direction and keeps on moving. However, it does appear to fade out after some distance, an effect which can be created in Illusionist by specifying the distance over which the light is to fade out. This is especially useful in situations with dark rooms and dim lighting.

One of the hardest aspects of using a 3D editor is being able to visualise the end product from flat 2D elevations. Illusionist provides a window whose sole purpose is to give an idea of what the finished picture will look like. Even though this program is far quicker than, for instance, Render Bender 2, it still makes sense to see the results before waiting an hour or so for the final picture to appear. To keep things at a sensible speed it only displays a wireframe outline, and only updates itself when requested.

Two other preview modes let you see how your design will turn out. A full screen, wireframe outline can be drawn to show the positions of objects in the finished scene, and a small Mode 13 version of the final picture can be plotted to allow you to check colours and lighting.

When you are happy with your composition, having

checked the various preview modes for position and colour, the scene can be drawn. Any 256 (or eight-bit) colour mode can be used on a standard Archimedes. If you have the Graphics Enhancer fitted then Illusionist automatically works out the best 256 colours to use.

The time to render a picture depends on several factors. The higher the resolution, the more pixels there are to be plotted and hence a longer time is required. Anti-aliasing can be applied during rendering. This will smooth out any jagged lines by plotting intermediate coloured pixels between the offending gap, but does slow down the speed. Similarly the Closest-fit algorithm, used to select optimum shades for colour mixing, also delays the process.

Rendering can be set to use all of the computer's processor time. The image will be produced in a much shorter time, but you won't be able to multitask. Further reduce the time by switching the screen off. The unfinished picture can be inspected at any time, and rendering stopped, if needs be, by clicking on the mouse button.

If you want to use the computer while rendering, you open a window into which the picture is drawn. However, this is very slow and not very practical on an Arm2 machine.

Finished screens can be saved from Illusionist in one of three formats. Standard sprites allow screens to be easily transferred to other Archimedes packages such as Paint or Revelation, but these do take up quite a lot of space.

A new version of Clares' compressed screen file format can be used, greatly cutting down on the storage space needed. At present it is incompatible with Clares' ProArtisan although two conversion utilities are provided to change files from old to new specifications and vice versa. An eight-bit Tiff format allows pictures created in Illusionist to be transferred to other non-Acorn computers.

Full 24-bit colour screens can be created, even without the Graphics Enhancer. By selecting the 24-bit render mode, a file opens on a disc preferably a hard disc, given the amount of space required. This is used to write data to, as the image is produced. As a typical 24-bit colour picture occupies well over 1Mb it is only really available to users with suitable on-line storage.

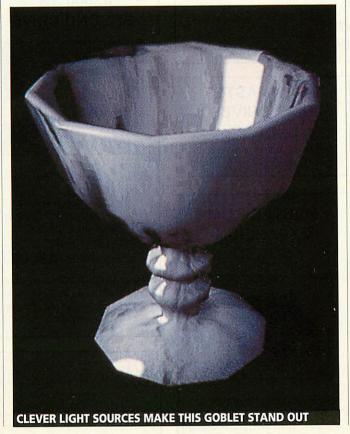
### CONCLUSION

Given time (and a few careful readings of the manual) you can produce stunning results with Illusionist. Although it is quite difficult to get used to, it is also an extremely capable piece of software.

Designing 3D scenes in a 2D environment (the monitor screen) is always a task that requires thought. The methods used in Illusionist work well and compare favourably to other 3D editors.

One or two refinements would make it easier to use. Resizeable windows for the elevations would allow the extra screen area on highresolution multiscan monitors to be utilised, and if only the selected object was shown, editing would be simpler.

At the moment though, Illusionist is by far the best art creation package available; much better in my opinion than its cousin Render Bender 2. If you wondered why you ever bought a Graphics Enhancer, then here's the reason. For around £300 (Illusionist + Graphics Enhancer) you can produce artwork of similar quality to professional graphics workstations. It seems insignificant when compared to the half a million quid for a Ouantel Paintbox system.



### PRODUCT DETAILS

- Product: Illusionist
- Supplier: Clares, 98 Middlewich Road, Northwich, Cheshire. Tel: (0606) 48511
- Price: £85 plus VAT
- Machines: Works with all Risc OS machines
- The Graphic Enhancer podule is available from Serial Port, tel: (0243) 531194

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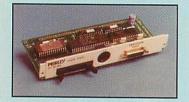
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# SING SOMETHING SAIVIPLED

# RICHARD GARRETT

exercises his vocal chords and examines the new Karaoke craze

mong the many cultural imports to have taken root in recent years, few can be considered quite as curious as the Japanese phenomenon of Karaoke. For anyone who has not yet heard of the craze, Karaoke is a practice whereby a group of people get together, usually around a microphone and a large hi-fi, and take turns to sing along to instrumental versions of well-known songs.

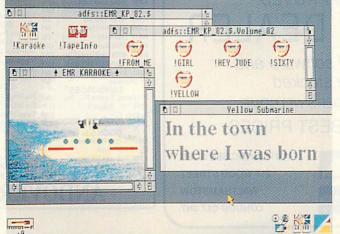
If you've ever tried this game, you will know that the hardest part, excluding the stagefright and ribald cheers of your audience, is remembering the words...

To deal with this problem, Electromusic Research have produced Karaoke Performer, a package consisting of an audio cassette and a BBC or Archimedes/A3000 disc. At present, EMR supports 90 volumes of music from the 1950s through to the early 1980s, with the emphasis on the kind of songs that tend to make good jeans' adverts.

#### SINGING ALONG

Karaoke is installed from the desktop by double-clicking on the icon. When you call up a song file, the first lyrics appear in big letters. You then select the Play option and a mouse icon with the word GO appears. At this point, if you're like me, you get up, rush around looking for the cassette player, find it, stick the cassette in, search for the right audio track and set the tape rolling just before the beginning of the tune. When the music starts, you finally click on the mouse.

In some songs, there follows a short pause, while the band plays the introduction and the computer waits for the lyrics start. Once the music reaches the first verse, each



YELLOW SUBMARINE – JUST ONE OF THE KARAOKE CLASSICS

successive word is highlighted in red, more or less in time to the music, and you sing along!

When the tune ends, your performance, no matter how bad, is met by an eight-bit sample of rapturous applause, whistles, and so on, from the internal speaker. This can be set to one of three durations or, if you have a modest nature, you can switch it off altogether. Dedicated egomaniacs, on the other hand, can get the full effect by producing the applause on a stereo, via the computer's headphone socket.

#### KEEPING IN STEP

As you may have guessed, a key factor in using Karaoke Performer is synchronisation. Since no cassette machine runs at exactly the right speed, EMR provides three timing options to help match the lyrics on screen to the music on your tape player. Re-time allows you to change the timing of the song by tapping a key, each time you sing a word during playback. This is a nice trick, but requires a fair level of musicianship to do it well. Adjust is easier to use and alters the running time of the

whole song by between +99 and -99 seconds, moving all the words accordingly. The third, and my favourite, method uses the left and right arrow keys to 'nudge' the highlight back and forth as the tune plays.

Karaoke Performer three display options: a small window showing about two lines; a full screen which displays five lines of big text and a video mode which superimposes the lyrics on to video with genlock. It also comes with a copy of Ace Computing's Projector which runs a short animation to go with one of the songs.

One confusing aspect of the program is its method of scrolling. As the song progresses, the highlight moves through the text and down the screen, with new text appearing above it, to replace the old. The average user would surely be more at ease with a conventional scrolling screen.

### CONCLUSION

Karaoke Performer is a fun program with obvious uses for primary school music lessons. It may also be of some benefit

for literacy studies. To appeal to a secondary school audience, however, it may need to provide some more contemporary titles (sing-along-a Guns 'n' Roses, perhaps).

Although the program looks simple, the timing options are sufficiently powerful to make it usable with most tape recorders. As for the music, it's typical library fare, clinically professional and serving up such standard fare as Beatles' classics.

But, there again, what do you expect for a mere tenner?

#### LOUDER THAN LIFE

To hear the backing track through something louder, you can use a special stereo lead. On one end of the lead, you need a 3.5 mm miniature stereo jack plug, which goes into the 32ohm headphone socket at the back of your computer. At the other end, you need connectors to suit your amplifier: ghetto-blasters often use another 3.5 mm stereo jack plug and most hi-fis use two phono plugs. The lead can be made up with a soldering iron, or bought from an electrical retailer. Once you get the lead, choose the best input on your amplifier. On a portable set-up, this is probably 'line in'. On a hi-fi, try the least sensitive input first (such as 'aux' or 'tape in'). Never connect the Arc to a record player input or to domestic microphone sockets and always work at low volume until you are sure that you are using the right socket.

#### PRODUCT DETAILS

**Product: Karaoke Performer** Supplier: EMR Ltd, 14 Mounts Close, Wickford, Essex SS11 8HG. Tel: (0702) 335747 Price: £10.00 plus £1.50 p&p

Machines: BBC, Arc/A3000

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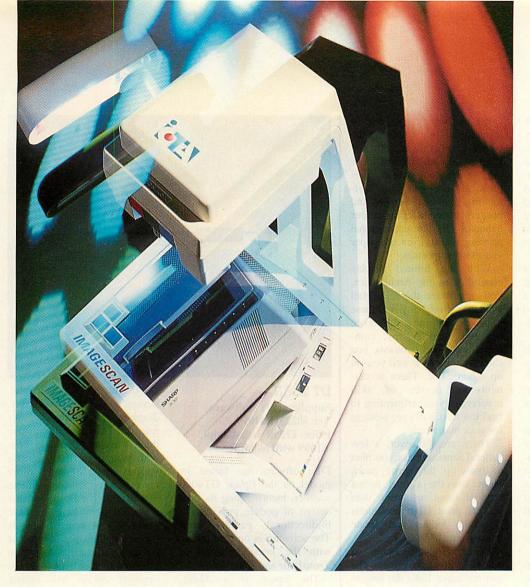
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A colour scanner can be a bright addition to your computer's repertoire. GRAHAM **BELL** helps you to make the right choice

# IMPROVE YOUR IMAGE

t was 16 months ago when Irlam Instruments launched the first colour scanner for the Archimedes. Now the original Irlam Image has been joined by several similar fullcolour scanners ranging from £549 to £1799. The one you choose could have a lasting effect on your computer images, so we tested a selection of the latest models.

We looked at four scanners in total: the Image's big brother, Pro Image, plus models from Iota, DT Software and Beebug. All of these scanners combine scanner mechanisms made in the Far East, by the likes of Sharp and Epson, with an interface Archimedes podule and software.

Colour scanners work in fundamentally the same way as monochrome scanners (see the review in BAU October issue). A series of mirrors or lenses focus an image of the object on a strip of light-sensitive CCD sensors - the brightness of the image is read from the strip and sent to the computer. This becomes one row of the sprite, as each sensor on the strip corresponds to one pixel. The strip is then moved along, so that it can read in the next row.

The differences between models arise because the colour scanners have three different coloured lights to illuminate the object. So for each row, there is separate red, green and blue brightness data, and each of them measures up to 256 levels of each colour.

The first Archimedes colour scanner, Irlam's Image, uses a white light and three coloured filters selected in turn. It took three separate scanning passes to build-up the full sprite (this is known as page-mode). Some of these new scanners,

such as those based on Epson and Sharp JX-300 units, can quickly switch colours as they scan, so only a single pass is necessary (line mode). At the computer end, the separate data for red, green and blue is combined into a single sprite.

There is one big headache with colour scanning - size. An A4-size monochrome scan at, say, 300dpi (dots per inch) totals almost eight million pixels. But, as each pixel can be either black or white, that is only one bit per pixel, or 1Mb.

Equivalent sized grey-scale scans could be either 4Mb with 16 shades of grey (four bits per pixel), or 8Mb when you use a scanner with 256 grey levels (eight bits per pixel). The colour images that these scanners produce can be up to eight bits per pixel per colour channel -

a whopping 24Mb per A4 page. So how many colours can the scanners see? Well, just over 16 million - yet, surprisingly, there are still some colours that the human eye can see, but these scanners cannot.

# TRUE COLOURS

scanners generate These 'sprite' data with up to 24 bits per pixel of colour information - 16 million colours. But Risc OS can only deal with sprites with a much smaller number of colours, either 16 chosen from 4096 shades, or a fixed set of 256 colours. So how do you create a sprite that contains fewer colours, while retaining as much of the original look as possible?

The answer is dithering mixing together pixels of different colour to mimic the real colour. Dithering is familiar a chessboard pattern of red and yellow makes orange. There is a better technique called error diffusion: you pick the nearest

colour for a pixel, and decide just how 'wrong' the colour is, then you correct for the mistake by adding colour to some of the surrounding pixels. It is easy to imagine in black and white: a dark grey area would be mostly black (the nearest colour) but with a few white pixels dotted around to correct for the black being 'too black'.

The ChangeFSI application and the routines in the current crop of scanner software use a particular algorithm (Floyd Steinberg Integer) for spreading the corrections irregularly around the original pixel. It tries to correct the colours while avoiding the obvious patterning effects that 'regular' error spreading would create in areas of solid colour.

ChangeFSI also contains separate processing stages for colour correcting and sharpening the image, which can improve the look of scans. The full application can also read many foreign file formats and convert them to sprites in a chosen screen mode. One important format is Clear the 24-bit standard used to store the data read from disc by many of these scanners. The scanner software uses ChangeFSI to mix this down into a usable sprite.

The public domain program, Translator, does much the same job as ChangeFSI, and probably just as well. It can, in some circumstances, be more flexible, but my preference is for ChangeFSI.

Getting 24Mb of data from the scanner to the computer takes time - that is why they all use special fast interfaces like the two-way parallel port or IEEE podules. And they cannot store the full image in memory, so as soon as the data arrives at the computer, it has to be put on hard disc. If you haven't got a large, fast hard disc, 4Mb or more of Ram, plus a bulging wallet, colour probably isn't for you.

# GET THE BEST SCAN

With all of scanners, there are ways to optimise the results you get - the ideal scan has clarity, good contrast and 'true' colours. Getting the best scan is usually a compromise between these objectives, and depends on what you want the image for. If you match a sprite as close as possible to the original then whack up the contrast on the monitor, it changes colour. The best-looking sprite on screen will probably not give the bestlooking print out. Screens and printers have differing colour balances. In the professional printing world, even the paper you use is important.

With the limited display capability of the Archimedes, you cannot see the full detail available from any of these scanners. But any difference between them is tiny, compared with the contrasts you can create by how well you set up ChangeFSI. There is certainly a degree of skill involved: try experimenting to find the best software settings for your own needs.

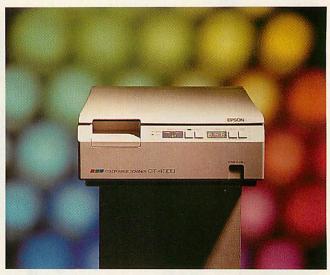
There are, however, a few general hints. Unless you plan to blow-up the sprite much bigger than the original, do not scan at more resolution than you can print. High resolutions just take longer and create impossible 10Mb files.

Do try out a range of gamma-correction values. The gamma curve links the brightness of the object with the brightness of the final image. You would think a straight conversion would be best, but the human eye cannot as easily distinguish between black and dark grey as it can between white and pale grey.

So gamma correction artificially lightens dark and midtone colours, thus increasing the apparent contrast. Too much correction and you lose detail in the brightly-lit parts of the picture.

And try pre-sharpening if this is an option. This imageprocessing technique emphasises the 'edges' in the image. A little sharpening definitely improves the look of most scans, but too much gives the image a cartoon quality with obvious outlines.

Having said that, take a look at our product boxes to see the merits of each individual scanner. We looked at four scanners in detail, but bear in mind that there are more coming on to the market all the time. A case in point is a new colour scanner from Clares, priced at £1799. The software is in the final stages and will be available in the New year.



DT SCAN

Suppliers: DT Software Tel: (0223) 841099 Price: £1299 with 400dpi, £1699 with 600dpi

DT Software has based its model on the Epson GT4000 scanner, incorporating its own design of podule providing a bi-directional parallel port. The software is on disc, along with the latest versions of Translator and ChangeFSI.

The Epson is a 24-bit, 300dpi scanner with a measure of intelligence built in. It can be made to do a number of gamma and colour correction functions, and a certain amount of dithering of colours when you set it for fewer than 24-bits. The correction facilities are fixed, not variable, and are set-up to give the best reproduction on monitors and low-quality colour printers, like dot-matrix machines with colour ribbons.

One of the more bizarre features of the scanner itself is that by connecting it directly to an Epson colour dot-matrix printer, you can use it as a



colour photocopier. Setting up the software is easy, despite the skimpiest of manuals. All the settings are done via one dialogue box, with buttons for the scanner's various gamma and colour correction options. A generic but informative Epson manual describes significance of these features: one unusual idea is the selectable drop-out colour for grey-scale scans (if you use coloured light to scan, then the opposite colour will appear black, so green light makes any magenta in the object look black). But the dialogue isn't perfect - for example, the dropout colour is only relevant for grey scale scans, so it should be greyed out when colour scanning is chosen.

Pressing Go presents a standard Save box, and a Clear file icon to drag to a hard disc. Scanning a postcard-sized photo takes only four or five minutes, the machine remains multi-tasking, and the scan can usually be paused. A minor bug in the software meant that the pause controls did not always appear, but this should be fixed.

Scans are always saved as Clear files - 3Mb or so for a postcard-sized scan. They retain the full 24-bit colour data, but it means that creating a sprite is always a two-stage process. Translator ChangeFSI both accept Clear files and convert them to sprites. However, getting to grips with these complex utilities would not be necessary if they were better integrated and sensible defaults provided - as they are with the Pro Image scanner, for example.



#### PRO IMAGE Suppliers: Irlam Tel: (0895) 811401 Price: £1659

Irlam uses the Sharp JX300 scanner in the Pro Image. It is a flatbed design with a removable cover over the glass (so you can scan thick objects like book pages by taking it off). It is a slightly neater design than the DT Scan model, but is less intelligent - the scanner itself does no image processing or colour correction.

An IEEE podule is included and a good-quality cable links it to the scanner. Software installation consists of copying a single application from floppy to your hard disc. The Irlam manual is sketchy, but the application works exactly as you would expect. It is a development of Irlam's original Image software, but now caters for higher resolutions and includes a greater image processing element. A click on the icon opens a control window ready to do a pre-scan.

Pre-scanning always scans the whole page, but it is



remarkably quick and the scan builds up on screen. It can be stopped at any time and the machine remains usable.

You can also choose full colour or grey scale, and set the colour depth (18 or 24-bit colour) and scan resolution this way: anything from 50 to 300dpi. Pro Image also incorporates the key features of the ChangeFSI program: it is not a separate package. Although the defaults are sensible, you can select a level of gamma correction, a certain amount of pre-sharpening and so on, as well as choose the format of the final output. It supports Clear, TIFF and JPEG files, as well as sprites.

Pressing the Scan button starts it off: scanning a postcard-sized image, at 200dpi or more, takes several minutes, but you can do other things. Pro Image also carries out FSI-based dithering and displays the sprite on screen as it goes along. Because of this, it needs a vast amount of memory: 4Mb is enough to scan your holiday snaps, but anything much bigger is out of the question. You cannot turn the preview display off to conserve memory and just scan to disc - definitely a drawback.

On the plus side, the quality of the scans is impressive. The Irlam software is reliable, easy to use, but really needs lots of memory. The DT scanner can get away with fewer megabytes, but is less integrated: ChangeFSI is a separate application with a complicated menu structure, and it is less approachable than the 'simplified' version built in to the Irlam software.



# IMAGE

Suppliers: Iota Tel: (0223) 421542 Price: £597 upwards depending on 'extras'

This is definitely the most unusual looking scanner. The Chinon mechanism interesting, but close up it has that slightly low-cost plastic look. Certainly, the quality of construction is not as good as the other units in this review.

Also, while all of the other scanners are fully-motorised, the Iota model differs in that you have to change the filter colours manually during the scanning process.

Setting up the scanner and well-built podule is straightforward, but fixing the lights is not. Giant blobs of Blu-tak finally did it, as there isn't any fixing point on the scanner itself: the lights seem to have been an afterthought. The Chinon senses the ambient light only at switch-on, so make sure all the lights are on before powering up.

The scanner software is varied and simple, with a tool-



box duplicating the few menu options. It starts up ready for a pre-scan, which builds up in the main window – then you change to colour scanning, choose a resolution and Go. But the resolution is limited to 75dpi in colour - all of the other scanners go up to 200dpi or more. The software reminds you to set the red filter, then builds up the red image. After a filter change, this is overlaid by the green image, and finally the blue. In all, five minutes or so is needed at maximum resolution, to scan in a postcard-sized snapshot.

But even after considerable experimentation, the quality of images from the Chinon was disappointing when compared to the other scanners - even allowing for their lower resolution. And the software does not give you any more advanced options, like gamma correction and so on.

The design of the Chinon gives it one unique advantage - you can scan objects with depth. The optics in the scanner head keep items up to about half-an-inch thick in reasonable focus. But the drawback is that, as neither the scanning head or lights move, there is significant distortion of the image towards the edge of the area. The light quality varies noticeably across even a small picture and, as it scans, the head vibrates slightly on its arm. This could be the cause of some pattering on scans - it sometimes looked as if scans been taken from magazines, giving a rosette moire pattern, when in fact the originals were continuous tone photographs.



#### SPECTRA

Suppliers: Beebug Tel: (0727) 40303 Price: £549

Beebug's Spectra model is based on the Sharp JX-100 A5-sized scanner used with the original Irlam Image. Because of this, it lacks some of the flexibility of the other units in the review. It scans in page mode, and takes about 12 minutes to produce a postcardsized scan at 200dpi - surprisingly, it is comparable in speed to the Sharp and Epson A4 scanners, despite using a serial, rather than a parallel, interface.

Setting up is similar to the other units - you fit a podule and plug it all together. This is explained well in the manual the early draft available for the review was the best of the bunch by far. The software is also commendably simple and much of the complication of ChangeFSI is hidden – all you have to do is choose the area of the scan and click.

The monochrome pre-scan is disappointing. It is not



amazingly fast, it doesn't show the sprite on screen as it goes along, and when it finally does appear, it displays in a muddy grey shade with relatively poor detail. The threshold between white and mud is wrong for most subjects, so it is difficult to set the real scan area accurately. But once this is done, scanning can proceed.

Again the software does not build up the image on screen, but it does gradually fill the window with red, green and blue on subsequent passes. It gives a good indication of how far it still has to go, and you can still use the machine for something else. After scanning and a pause for ChangeFSI to dither the 24-bit data down to a sprite, the image is displayed. The quality is remarkably good - and compares well with the bigger scanners.

You can use the Process dialogue to change ChangeFSI parameters if you want particular results. But, significantly, the default gamma correction setting is quite different from the other scanners, so the first image a beginner sees will immediately look better on screen.

Toning down the gamma correction can give better results, if rather less impressive on-screen. There will be less contrast, which always looks effective, but the colours will be truer to the original.

Beebug is probably a good option for those with a lower budget who don't mind not having full A4 capacity. In fact it is comparable to the original Irlam Image scanner, which is now priced at £599 with the new software of Pro Image.

#### THE LINE UP

The original photograph of the Sardinian dancer presents a tough test for any scanner. It's a picture with very high contrast, and a wide range of brightness - from full Mediterranean midday sunlight, on pale flagstones, to the black velvet of the dancer's skirt. So a scanner's ability to retain detail over a wide range of brightness values is paramount. Skin tones are always a good test, and the shading of the dancer's face is subtle and difficult to capture.

Remember that the original picture (right) has been scanned too by our repro company, Trumps.





Spectra: scanned with lowered gamma correction. Still too much contrast, but impressive



Image: poor as the colour balance varies across the picture, plus low resolution



Pro Image: paler on-screen than DT's, but more due to ChangeFSI than the hardware



DT Scan: used the intelligence of the scanner (mode B) - just not enough gamma correction

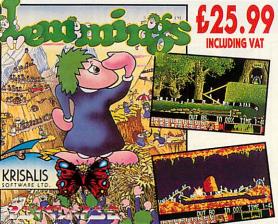
# CONCLUSION

The full-size A4 scanners from Irlam and DT vary little in their capabilities and are also more or less the same price. While the DT Scan model nominally does more of its own gamma correction and so on, you can often get better-looking results by ignoring all the printer's intelligence and using ChangeFSI afterwards. The more integrated Irlam software, that comes with Pro Image, is a little easier to get to grips with, but requires more memory for the same sized scan. For anything more than postcard size scans at 200dpi, you will need an upgrade to 8Mb.

In the lower price bracket, the choice is more stark: the extra flexibility of lota's Image, which can scan in A4 images, or the quality of the Beebug Spectra, as shown in our results. Assess carefully just how important A4 size and the ability to scan solids is, and make sure you see the lota product in action, before committing yourself.

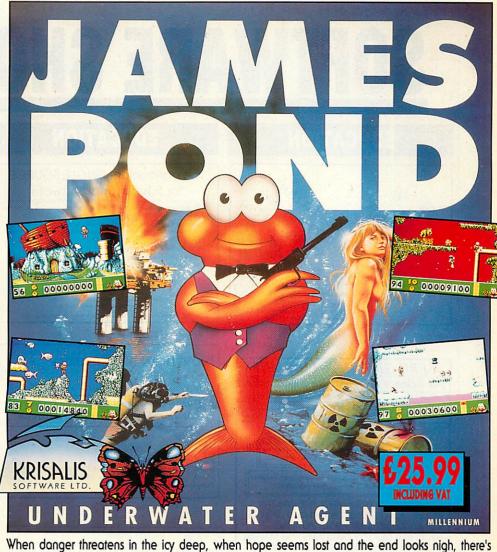
Whichever you are interested in, remember that colour is difficult and expensive to print out properly, so your work may be confined to the screen. (For an overview of colour printers see our review in BAU, July 90.) And, remember also that, as with the argument which raged over the conversion of the movie Citizen Kane, poor colour can sometimes be worse than no colour at all.











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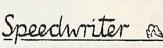
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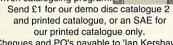
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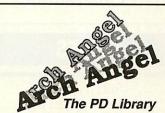
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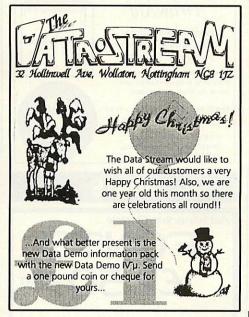
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# £25 Prize - Jugglery!

This month's prize puzzle is deceptive simply; take the 12 signs of zodiac (they are listed below) and arrange them Scrabble-like on a board so that the size of this board is minimized. All words must be written from left to right or from top to bottom. No word may be isolated - it must share at least one letter with another word. No two letters may be adjacent horizontally or vertically, unless they are consecutive letters in one of the words to be fitted on the grid. And hence, no other words are permitted.

As an example, the 12 months will fit on to the 9x13 board shown below (an area of 117 squares). The 12 signs are: Aries,

Taurus, Gemini, Cancer, Leo, Virgo, Libra, Scorpio, Sagittarius, Capricorn, Aquarius and Pisces. To give you a start, you should aim for a board with less than 150 squares. The sender of the solution with the smallest board will win the prize of £25.

Please send your entries on a postcard to BBC Acorn User, 20-26 Brunswick Place, London, N1 6DJ to reach us by Friday January 17 1992. The solution (and the winner) will be published in the March issue.

| TE <sub>0</sub> |   | M | A | Y |   |   |   |   |
|-----------------|---|---|---|---|---|---|---|---|
|                 |   | Α |   |   |   | N |   | J |
| A               | P | R | I | L |   | 0 |   | A |
| U               |   | C |   |   |   | v |   | N |
| G               |   | Н |   |   |   | E |   | U |
| U               |   |   |   | D |   | М |   | A |
| S               | E | P | Т | E | М | В | E | R |
| Т               |   |   |   | C |   | E |   | Y |
|                 | J | U | N | E |   | R |   |   |
|                 |   |   |   | M |   |   |   | J |
| 0               | C | Т | 0 | В | E | R |   | U |
|                 |   |   |   | E |   |   |   | L |
|                 | F | E | В | R | U | A | R | Y |

#### Crossnumber

B H Davies of Leeds earns himself £20 for this crossnumber puzzle. He actually sent in five, so you may well see the others at some point in the future!

In this puzzle, only the digits zero, one, four and eight are used and no number has any leading zeros or occurs more than once in the grid. Can you deduce the solution? If not, check out next month's puzzle page, where we will reveal all!

| 1  | 2 | 3  |   | 4 . |      | 5 |
|----|---|----|---|-----|------|---|
|    | 6 |    |   | 7   |      |   |
| 8  |   |    | 9 |     | 98   |   |
|    |   |    |   |     |      |   |
|    |   | 10 |   |     | 11   |   |
| 12 |   |    |   | 13  |      |   |
|    |   | 14 |   |     | Sign |   |

| Across               | Down      |
|----------------------|-----------|
| 1 Square             | 2 7a+11a  |
| 6 Square root of 11d | 3 2x13a   |
| 7 Square             | 4 Square  |
| 8 10d-11d            | 5 Square  |
| 9 Square             | 8 Square  |
| 10 12a/8a            | 9 Square  |
| 11 2d-7a             | 10 Square |
| 12 Square            | 11 Square |
| 13 7a/6a             | 13 Prime  |
| 14 Square            |           |

## Leeming!

NOTICE: Due to an unforeseen spelling mistake, this month's one line game is called Leeming. We would like to take this opportunity to point out that no similarity was intended to be drawn between this and any other games currently on the market. Future copies of the game will be made available under its correct name of Sachet. We hope this does interfere with your pleasure of the game.

Leeming features over 300 levels complete with 200K of stunning graphics and 27 highly atmospheric pieces of background music or at least it did on the drawing board. Of course, during the production phase of the game, many of these features have had to be trimmed and pruned, but we feel that the final game (shown below) is a far more streamlined product than we first envisaged. The idea of the game is to help the Leeming reach the top of the screen. Left alone, he

10 MODE7

will walk left and right and fall off any surface. Three keys are provided to change the Leeming's task. 'B' will start him building a bridge. He will stop when 'B' is released or he hits the underside of an existing block. You can make him dig downwards, through blocks he has placed when building, by pressing 'D'.

Similarly, pressing 'M' will tell the Leeming to mine sideways through blocks. Note that it not possible to dig either way through the solid white blocks.

To enter the listing, first type in the function key definition shown below then carefully enter the Leeming game. Do NOT enter any spaces after the line numbers. To squash the program onto one line simply press F0. The resulting single line can be saved in the usual way.

20 D=TRUE 30 y=4040 REPEATVDUD 50 UNTILVPOS=24 60 VDU284;22,294;12 70 FORW=0TO94 80 ?(HIMEM+RND(920))=D 90 NEXT 100 X=HIMEM+W 110 o=X 120 REPEAT 130 REPEAT 140 ?0=0 150 ?X=38 160 T=INSTR(" DBM", INKEY \$9) 170 o=X  $180 \ a=-y*(X?y<33)$ 190 a=a-y\*(T=2)\*(X?y=W)\* NOTSGNA 200 X=X+a 210 UNTILa=0 220 a=-D\*(X?D<33) 230 a=a-D\*(T=4)\*(X?D=W)\* NOTSGNa 240 X=X+a 250 D=D\*((a=0)\*2+1) 260 IFX?-y<33ANDT=3 X=W: X=X-y:UNTILOELSEUNTI LX<&7C50

\*KEY0 f=PA.+4:t=f:b=&F5:REP.c=(b<>&F5):?t=-?t\*NOTc-58\* c:t=t-c:x=f?-1:FOR i=1TOx-4:b=?f:?t=b:f=f+1:t=t+1:N.:f=f+4:U.f?-3=&FF:?t=&D:t?1=&FF:?(PA.+3)=t-PA.|M

#### Solution to December's Pathword puzzle

There were 47 words in total, including the 13 letter word configuration. The other possible words were: agonic, anion, anon, anti, antic, artic, aunt, coin, conation, conga, congo, contra, cooing, font, gain, gait, gaunt, gaur, gnat, goon, guano, icon, info, nation, noon, octagon, onion, ragi, rain, rang, rant, rating, ratio, ration, rung, runic, runt, tang, tango, ting, tragi, train, trug, union, unit, uranic.

# Solution to November's Six-pack puzzle

The 20 hidden words were all Basic keywords and all of them started with different letters of the alphabet: ADVAL, BGET, COLOUR, DELETE, ENVELOPE, FALSE, GOSUB, HIMEM, INPUT, LOCAL, MODE, NEXT, OPENOUT, POINT, RENUMBER, SOUND, TRACE, UNTIL, VPOS and WIDTH.

There were 15 unused letters that spelt out OPERATING SYSTEM. The first correct solution out of the proverbial hat came from Geoff Morley of Cannock, Staffs, who wins £25.

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ProI-Mage



# Elucidata



# Optical character recognition

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- ☐ Handles proportional fonts

# AlterI-Mage



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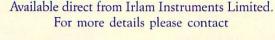
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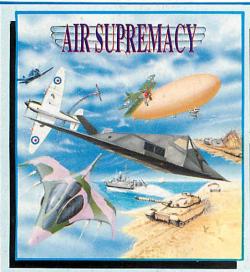
All software RISC OS compliant Products carry full one year guarantee. Hardware includes complete package of software etc.

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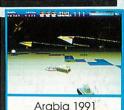




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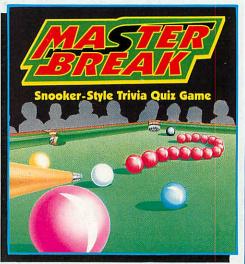
Start your frame with an easy red question, then choose your colour have you the nerve to choose the black ball question? You've used all your PASSES and the ball is OVER THE POCKET - if you miss, it's a FOUL SHOT!

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